910.9 C512
Exploration and travel. 14

"There can be no question about the value of the land north of the Saskatchewan, and settlers going in there are assured of three essentials—wood, water and hay for cattle.

* * * *

"The low altitude, and the long day are fixed conditions and will always remain the same."

Prof. John Macoun, Naturalist,
Geological Survey of Canada.

A SETTLER'S GARDEN AT MEADOW LAKE, 125 MILES NORTH OF BATTLEFORD.

DEPARTMENT OF THE INTERIOR, CANADA

New Northwest Exploration

Report of Exploration by

FRANK J. P. CREAN, C.E.

In Saskatchewan and Alberta

North of the surveyed area, Seasons 1908 & 1909

OTTAWA
GOVERNMENT PRINTING BUREAU
1911

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OTTAWA, June 1st, 1910.

HONOURABLE FRANK OLIVER,
Minister of the Interior,
Ottawa, Canada.

SIR,—I have the honour to transmit herewith the report dated May 2nd, last, of Mr. Frank J. P. Crean, C.E., of my Branch giving the results of the exploration carried on by him during the season of 1909, covering that portion of the Provinces of Saskatchewan and Alberta extending north from the present surveyed area to the Clearwater River and extending from Green Lake, the Beaver River and connecting waters as far north as Portage la Loche on the east to the Athabaska River on the west.

Mr. Crean's report of his exploration in the season of 1908, which covered that portion of the Province of Saskatchewan lying immediately east of the above described tract, was—under your instructions—printed for public information; but owing to the great demand for copies the edition has been exhausted and it is now proposed therefore to issue the two Reports in one new publication.

The gross area covered by the two reports, and as to which some information has been gathered, might be stated at approximately thirty-four million (34,000,000) acres.

The exploration in the year 1909 shows results even more satisfactory as to the possibilities of the country for settlement than the exploration of the previous year. A very considerable proportion of the area explored is shewn by Mr. Crean's observations to be well adapted for mixed farming and having natural resources of timber, hay, fish and game which will be of much value to incoming settlers. Results of actual operations in cattle raising are of a most encouraging nature. At and in the vicinity of Meadow Lake over 100 miles north of Battleford, there are herds of cattle aggregating over 300, and over 50 horses, all of which are described as in a thriving condition. At Cowpar and Winefred Lakes towards the western part of the tract explored and in the Clearwater Valley to the north, conditions seem also most promising for stock-raising. It may be of interest to note here that recent reports of investigations in Siberia, Mongolia and Northern Manchuria by the Bureau of Plant Industry of the Department of Agriculture of the United States, give accounts of the discovery of three varieties of yellow-flowered alfalfa which are found growing and thriving in a wild state under conditions of climate much more severe, both as to cold in winter and snowfall, than are to be found in any part of Northwestern Canada as far north as there are any claims made as to possibilities of settlement. It may therefore be considered reasonably probable that whatever advantages alfalfa has over our native grasses as fodder are assured for all habitable parts of our north country.

SOME HISTORY AS TO REPORTS ON THE NORTHLAND.

The work of exploration now being carried on under this Branch is the first ever undertaken in any systematic way of the North Country to ascertain its possibilities for settlement. It may be of interest to give here some history as to previous reports issued by the Dominion Government on that portion of Western Canada.

In the years 1887-8, Select Committees of the Senate under the presidency of the late Honourable Senator Schultz, gathered a large amount of most valuable evidence on the resources of that part of Canada north of the Saskatchewan watershed and lying between Hudson Bay and the Rocky Mountains. The Committee

of 1887 was appointed for the purpose of ascertaining the possibility of development in the growth of food products in the whole Northwest but collected valuable information about the country north of the Saskatchewan watershed. The Committee of 1888 was appointed for the special purpose of collecting evidence from every available source on the Great Mackenzie Basin.

Though the information contained in the Reports of these two Committees as to the possibilities of development in this then little-known portion of Canada was most striking, the fact that there were then and for many years afterwards immense areas of fertile prairie land available for settlement in the country along and contiguous to the Canadian Pacific Railway main line and its branches prevented public attention being drawn to the more remote territory referred to. The reports of these two Committees were about a year ago republished by this Branch of your Department in a convenient form for public information under the title "The Great Mackenzie Basin," and the demand for copies has been so great as to demonstrate the very general interest at present in the subject of Canada's undeveloped hinterland.

In the year 1905 I had the honour of drawing to your attention statements and maps I had prepared shewing that the tide of immigration into the prairie west South of the Saskatchewan River then reaching quite large proportions, and which has been very much augmented in each succeeding year since that time, would at no distant date exhaust the available land for free homesteads. It therefore appeared advisable to endeavour to obtain as full and up-to-date information as possible of the north country with a view to undertaking exploration of those portions most likely to be attractive to settlement. I had also a map prepared which I had the honour of submitting to your attention shewing all then available information about the north country. It was in consequence of these representations that the motion for a Select Committee was made by the Hon. T. O. Davis in the Senate, and that the Committee was appointed under his chairmanship in the year 1907. The result of this Committee's work has become widely known mainly through the publication by this Department of its report in a special edition with maps under the title "Canada's Fertile Northland."

Copies of this publication are now to be found in leading libraries in every civilized country and upwards of 10,000 copies have been distributed to individual applicants. A new edition under the title "The New Northwest" and with the sub-title "The Senate Report of 1907" is now in press to meet the demand for copies which continues unabated.

This report of Mr. Crean's explorations is also proposed to be published under the same title and with the sub-title "Report of Explorations by Frank J. P. Crean C.E."

I have the honour; to be,

Sir,

Your obedient Servant,

R. E. YOUNG,

Chief Geographer and Superintendent
Railway Lands

THE REPORT OF 1908

GREEN LAKE SETTLEMENT.

DEPARTMENT OF THE INTERIOR,

OTTAWA, May 1st, 1909.

SIR:—I have the honour to transmit herewith the report dated April 10th last of Mr. Frank J. P. Crean, C.E., of my Branch, giving the results of his exploration last season covering a portion of the country north of Prince Albert to the Churchill River and bounded on the west by Green Lake and the Beaver River. I also attach a copy of my instructions to Mr. Crean, dated August 6th, 1908.

Mr. Crean's report gives a great deal of useful information about the district, and the results of his observations appear to shew that mixed farming may confidently be expected to prove successful over a large area. When the country is made accessible by roads a considerable settlement of agriculturists may, I think, be looked for. The country is also shewn by his report to be rich in natural resources.

I have the honour to be,

Sir,

Your obedient servant,

R. E. YOUNG,
Superintendent Railway Lands Branch.

HONOURABLE FRANK OLIVER,
Minister of the Interior,
Ottawa.

LETTER OF INSTRUCTIONS

RAILWAY LANDS BRANCH, DEPARTMENT OF THE INTERIOR,

OTTAWA, Aug. 6th, 1908

FRANK J. P. CREAN, ESQ., C.E.,
Ottawa, Ontario.

DEAR SIR:—Respecting the exploration of which you are taking charge the following instructions are given you:

You will at once proceed with the necessary arrangements for your departure, procuring and forwarding necessary equipment and supplies to Prince Albert, so far as same cannot be more advantageously procured at that point. It will no doubt be most advantageous to deal with the Hudson's Bay Company as far as possible as that Company has posts along your route. A letter of credit can be obtained from the Company and be used instead of carrying cash.

The object aimed at is to procure all the information possible about that tract of country lying to the east of the Beaver River and Green Lake, south of the Churchill River and extending east to the old canoe route from Cumberland House via Frog Portage to Stanley Mission. The water routes in this district have been travelled by many travellers and explorers, but as little is known of the interior, particular attention should be paid to obtaining information about the character of the country away from the travelled routes. Expeditions should be made inland and the approximate course and distance noted.

The object of this exploration is to ascertain the value of the district to be traversed for farming, lumbering and mining purposes, and any useful information bearing upon these subjects not included specifically in these instructions should be included in your report. You will keep a diary in which will be entered your work from day to day, the direction travelled, whether by land or canoe, if the latter, by what streams, their size, and all particulars thereof, entering full observations as they are made, and under the proper date. Yourself and assistant will also keep a careful record of temperatures every morning and evening, also barometer readings. Whenever your assistant is travelling separately from you, he will be expected to keep a diary covering the same information.

It is not intended that you should be given exact instructions as to the route to be taken. You will be expected to decide on that point from such information as you can gather before leaving Prince Albert. Your instructions are necessarily general in their character as it is impracticable to give directions which shall meet every contingency or set of conditions that may arise, and much must necessarily be left to your good judgment. Both yourself and assistant will keep steadily in mind the object of the expedition and aim to bring back all information which would be of interest or value concerning the district to be explored, even if not specially referred to or required in these instructions. You will be careful to require your assistant and any man temporarily employed by you to carry a small axe and a box of matches when starting on any side trip alone, and observe the same rule yourself.

You are being supplied with two cameras, one for yourself, and one for your assistant. You will both take every convenient opportunity to take photographs of anything you meet with which will be of special value in connection with your report. It is specially desired to have good photographs of any growing or harvested crop in the district, which you may have an opportunity to take.

These photographs, and also any and all information you or your assistan
and party may gather, are to be considered as the property of the Department.

The information to be acquired by you will embrace:—

(1). The nature of the soil,—whether sandy, gravelly, clay, etc., and it
quality, and whether in your opinion it is capable of producing grain, hay or an
other kind of crop. Wherever it is found that land has been occupied and cul
tivated or is now being cultivated, as for instance at posts of the Hudson Ba
Company, you will make mention of the circumstance, and give such particular
as you can obtain of the success or failure of such cultivation. If you meet wit
any considerable peat deposit give such information regarding it as you can co
veniently obtain.

(2). The various kinds of forest trees and the extent, size and quality of th
timber, the comparative prevalence of the several varieties and generally a
information concerning the forest growth and conditions which may be useful
valuable. You will also particularly note the extent of damage to timber by fi
and whether of recent origin or not. If you meet any case of extensive dama
from this cause within say the last year, get what information you can as to th
cause.

3). The fixed rocks met with, and economic minerals, if any.

4). The flora, collecting and preserving specimens for subsequent identi
cations where this can be conveniently done.

(5). The fauna, particularly deer, moose, elk, fur-bearing animals and bir
or information concerning any of these which can be procured from the India
also the several species of fish in the lakes and rivers.

6). The general features of the country from the explorations made on ea
side of the rivers and lakes.

(7). Valuable water powers, giving such information as regards the flow a
volume of water as can be conveniently obtained and an estimate of the fall
each case, also describing the banks on each side of the stream.

If any large body of timber of economic value be observed or any considera
tract of good land be met with, you will take such steps as may be taken with t
time at your disposal to arrive at a correct idea of its extent, nature, etc. Also
case a portion of the country appears to be of more than usual promise mineralo
cally. You should also indicate the most feasible ways in which land, timber
minerals may be opened up for occupation or use by roads, railways or waterwa

You will be supplied with 50 of the notices for "Prevention of Forest Fire
issued by the Forestry Branch of this Department. You will post these noti
wherever they may in your opinion be placed to the most advantage, and in ot
respects in regard to the protection of timber you will be expected to advise
assist the Department.

Your party will consist of Mr. W. R. Caldwell, who will act as your assista
and yourself, together with such temporary help as you may require, but it is
expected that you will employ more than two local men as canoemen and pack
Both in regard to the procuring of equipment and supplies and the employm
of labour and transport you will be expected to exercise due economy.

The members of your party including such temporary employees as you
engage are to be responsible to you and may be dispensed with if necessary.

An inventory of all articles of outfit supplied to you, or which you are
chasing at the Government's expense, should be made out by you and sent to
Department before you leave Prince Albert to be placed on file. This invent
to be itemized and classed under proper heads and in case of loss or damage to
of these articles, such loss or damage should be satisfactorily explained when y
final returns are made. Any article worn out and unserviceable shall be at
same time so reported with such explanatory remarks as may seem to be requi
Your assistant will be accountable to you for loss or damage to articles or ins
ments placed in his keeping for his use or otherwise.

When the approach of winter has made travel by canoe no longer possible you will be expected during the earlier part of the winter to cruise any timber which you may have noted. You will be expected to return by dog team as soon as the route is safe for such travel, or so as to report at headquarters about January 1st, 1909.

Your final returns will include the plotting on a large scale map of your routes travelled with remarks showing the approximate areas of good land, timber, and any additional information which can be shown. You will also make a copy of your notes and diary kept in the field for future reference.

You should arrange to leave Ottawa for your destination prior to or not later than August 10th.

Owing to the distance from ordinary lines of travel and irregularity of communication, it will not be possible to make reports of progress at regular intervals, but you will be expected to take such opportunities as may occur to keep the Minister informed of the progress of the work.

You are herewith furnished with a cheque for $1,500 payable to your order on account of travelling expenses, and general disbursements for yourself and party. This amount and further payments made to you to be properly accounted for.

All bills and vouchers must be rendered to the department in triplicate, properly certified by yourself.

(Sgd.) R. E. YOUNG,
Superintendent.

NORTHERN STREAM HARNESSED FOR THE USE OF MAN. POWER DEVELOPMENT AT LA PLONGE MISSION

NORTHLAND EXPLORATION

OTTAWA, April 10th, 1909.

To

HONOURABLE FRANK OLIVER,
Minister of the Interior, Ottawa.

SIR,—I have the honour to report on my exploration during the last season in the following letter of instructions to me, dated August 6th, 1908, and signed by Mr. R. E. Young, D.L.S., Superintendent of Railway Lands, I was to make an exploration of that part of Saskatchewan north and west of Prince Albert as far as the Churchill River covering as much of this country as time would permit.

The following are extracts from this letter:

"The object aimed at is to procure all the information possible about that portion of country lying to the east of the Beaver River and Green lake, south of the Churchill River and extending east to the old canoe route from Cumberland House by Frog Portage to Stanley Mission. The water routes in this district have been used by many travellers and explorers, but as little is known of the interior special attention should be paid to obtaining information about the character of the country away from the travelled routes. Expeditions should be made to note the approximate course and distance noted.

"The object of this exploration is to ascertain the value of the district to be explored for farming, lumbering and mining purposes and any useful information bearing upon these subjects not included specifically in these instructions should be reported in your report."

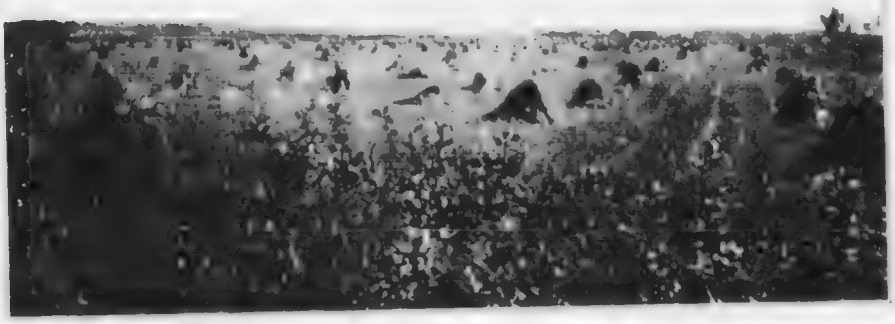
I have the honour to report that in compliance with the above instructions I proceeded at once by train to Prince Albert and arrangements were made with the Hudson's Bay Company to provide me with men and the means of transportation. In this they were not altogether successful and much valuable time was lost by the disinclination of the natives to work, although I offered double wages.

We left Prince Albert on August the 20th, 1908, and I returned on January 1st, 1909. My assistant, Mr. Caldwell, who I regret to say met with a painful and serious accident to his knee, returned somewhat earlier. I bear willing testimony to his valuable services. From Prince Albert I proceeded by team to the north end of Green Lake. The road from Prince Albert to Green Lake is a summer highway, and in most seasons of the year would be considered a fairly good waggon road except perhaps the last twelve miles.

After reaching Green Lake I travelled chiefly by canoe, making side trips by canoe when possible or when it seemed desirable to do so.

When the setting in of winter made further canoe travel impossible I procured dogs to continue the exploration.

An effort was made to keep a record of the temperature each day but owing to the fact that we seldom camped longer than one night in the same place and had to do our own cooking and in the winter drive our own dogs, this was found impracticable. However, I placed a thermometer at Ile a la Crosse in care of the Hudson's Bay Company, and had a temperature record kept there. At the conclusion of this report I give a table showing the result from August 27th, 1908, to March 15th, 1909.



PACAL AT MUSKEG ON THE GREEN LAKE TRAIL, 65 MILES FROM PRINCE ALBERT.

No attempt was made to accurately survey our route. Sketches were made of all topographical features of interest and a fairly accurate map has been compiled. In this I have used all data obtainable from the Dominion Lands Survey of the old canoe route and from the Geological Survey maps and other sources. Photographs were taken of anything which appeared to me to be useful or interesting and all possible information was collected from the residents in the country. Owing to the lateness of the season when the expedition set out the exploration was necessarily hurried; still, though the area covered was large, the report will be found to be accurate and because of the peculiar flatness of the country, fairly minute. The soil was investigated wherever it was thought necessary by digging a hole to a sufficient depth to ascertain the formation. To report on the whole area at once would be impossible, but in general it may be said that the whole tract, though not exactly fitted for agricultural settlement throughout in its present state, is still capable of producing large quantities of cereals and farm produce and supporting a large population. The over abundance of water and lack of natural drainage, causing large swamps and muskegs, might in my opinion be easily remedied by clearing out some of the rapids on the Churchill River and providing outlets for the surplus water where natural outlets are lacking. Very little work would be necessary to open fine waterways navigable for small craft throughout this country. To build roads passable in summer would be difficult but by no means impossible. Winter roads could easily be located and would not require much work or expense to build.

The climate seems well adapted for raising any cereal. In fact, wherever wheat has been tried it has grown successfully. At Portage la Loche, which is considerably north (Lat. 56 degrees, 35′, 11″), oats and barley have been grown. Wheat was not tried, but I feel sure it would grow successfully, notwithstanding the relatively high altitude. Portage la Loche has an altitude of about 1,677 ft. as compared with 1,398 ft. at Prince Albert. It is very much above the general level of the country to the south and east.

Professor John Macoun, the well known naturalist of the Geological Survey, points out that in considering the possibilities of agricultural development of all this northern country, one fact to be kept steadily in mind is the advantage of the low altitude and the long day, which are fixed conditions and will always remain the same. In altitude, Prince Albert is nearly 500 feet lower than Regina, and

on the Churchill is 260 feet lower than Prince Albert. A comparison of the hours of sunshine per day on sheltered days during the summer at Prince Albert and Portage la Loche, and for the purpose of comparison at Ottawa, shows as follows:

	Length of Day		Sunrise to Sunset			
	Ottawa 45 N. Lat.		Prince Albert 53 N. Lat.		Portage la Loche 56 N. Lat.	
	h.	m.	h.	m.	h.	m.
May 1	14	4	16	46	15	17
May 10	14	28	17	18	15	57
May 20	14	50	17	52	16	37
June 1	15	10	18	20	17	7
June 10	15	20	18	34	17	25
June 20	15	26	18	42	17	35
July 1	15	22	18	36	17	27
July 10	15	14	18	24	17	12
July 20	14	58	18		16	54
Aug. 1	14	36	17	54	16	20
Aug. 10	14	16	17	30	15	50
Aug. 20	13	52	17	1	15	16

The above table has been verified by Dr. W. J. Kinz, Chief Astronomer of the Department.

CUTTING OATS ON OCTOBER 1ST, AT ILE A LA CROSSE.

I did not see as many growing crops as I expected to. The reason of this is that in recent years the native has practically abandoned farming, confining himself to cutting hay, which he sells to freighters. Upon the advent of Revillon Bros., Ltd., as fur-traders in competition with the Hudson's Bay Company, the latter company gradually abandoned the water transport wherever it was possible to use horse transport instead, and with the increased use of horses, the native soon found it far easier to haul heavy loads of grain or flour than to grow it.

The gross area explored, and about which some information has been collected is approximately 16,000,000 acres. The water covered area in this tract (area of lakes and rivers) may be set down at approximately 3,000,000 acres, the remaining land area—13,000,000. I would estimate that an area of fully 3,500,000 acres is suitable for settlement as soon as surveyed and made accessible by roads and an area of about 8,000,000 acres of swamp or land probably too wet at present for successful cultivation, could be reclaimed at a moderate expenditure. All the swamp, will, however, eventually repay the cost of reclamation.

The above figures are, of course, the result of an exploration, extending over only a few months and must be considered only approximate. The distance travelled was about 3,000 miles of which 1,200 was made running behind dog trains.

The general report covering the whole tract follows, and in addition I have prepared a more detailed report by sections, which follows the general report.

TRANSPORT ON GREEN LAKE.

ACCESS.

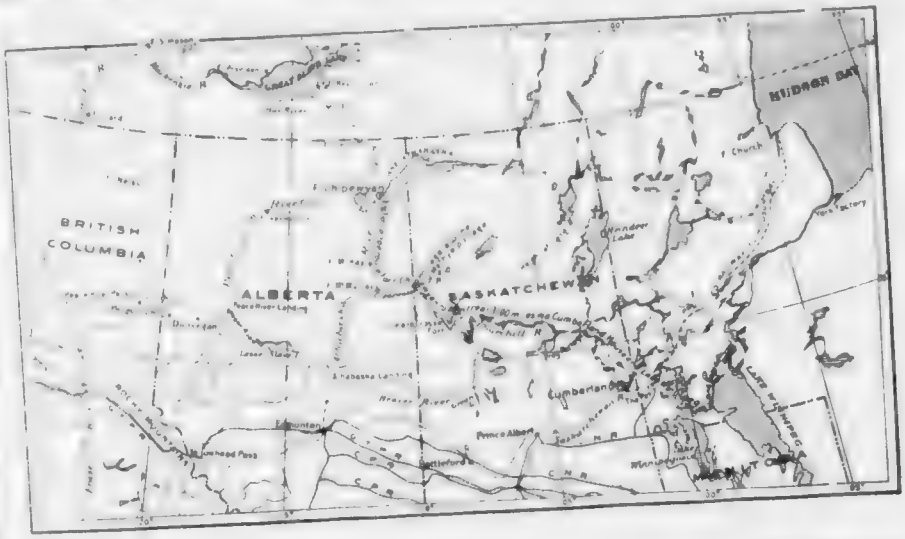
There are several routes by which one can reach the district I have explored but they may fairly be sifted down to two: the road to Montreal Lake and the road to the south end of Green Lake, both starting from Prince Albert.

The road to Montreal Lake while good in winter is almost impassable in the summer months. Though I did not travel over it I was informed that it was very rough and swampy. Some parties of prospectors went that way last year and managed to get through, though under great difficulties. The Green Lake road was reported to me as in every way superior though somewhat longer. From Prince Albert to Montreal Lake is generally estimated at 120 miles by trail while to Green Lake is supposed to be 150 miles.

Persons wishing to reach Lac la Ronge would of course go via Montreal Lake. If expert canoemen they might launch their canoes in Deer Lake and run the rapids on the Deer River. These rapids are very swift but can be run. By using the Deer River one would avoid the worst piece of the road. From Montreal Lake to Lac la Ronge the Montreal River is full of treacherous rapids, but they too can be run

There are several canoe routes from Lac La Ronge leading in almost every direction. To reach the westerly side of the great Green Lake road is the obvious one. It is also the better route to follow to Cree Lake and other points north of Churchill.

The Green Lake road is good to Devil's Lake, about 70 miles from Prince Albert, and there is a water route from this lake which has been travelled but I understand is not practicable for loaded canoes. From Devil's Lake the road crosses the Shell River and becomes rough and crosses some bad swamps. The Big River is crossed about four miles north from Shell River. Both these rivers are ridged. After crossing Big River the road traverses a piece of hilly country, about twenty miles and then returns to the valley of the river. After following the valley for about four miles it follows a small creek for some eight or ten miles, which becomes very bad and swamps occur frequently. The last twelve miles to the freight depot at the foot of Green Lake is almost impassable. From this freight depot the canoe route on Green Lake and Beaver River is good. There are no portages on the river going north. Rapids occur but they are easily run. From Isle a la Loche River, by which the connection is made to the Clearwater River on to the Athabaska is very shallow in places and is difficult to ascend owing to numerous rapids. Indians coming from Fort Chipewyan or Fond du Lac on Lake Athabaska come via Cree Lake and down the Montreuil River, but to furnish go via Cedar Lake, Island Lake, thence by water course with portages to Cree Lake, thence by the Cowlitin River to the height of land where a portage of about two miles long crosses the height of land, thence a small lake and river brings to Cree Lake. This region is reported to contain good indications of minerals.



SHEWING PART OF THE OLD FUR-TRADERS' CANOE ROUTE FROM MONTREAL TO FT. CHIPEWYAN ON LAKE ATHABASKA.

The old canoe route of the fur-traders, 3,000 odd miles in length, from Montreal to Fort Chipewyan on Lake Athabaska, passes along the north limit of the district covered by my exploration. This route is shown in part on the small accompanying map. It left the Saskatchewan near Cumberland House and a chain of waters was followed to Frog Portage, at which point the Churchill was reached, thence up the waters of this river with its numerous lake expansions to Portage la Loche, thence

down the Churchill and the Athabasca to Lac La Biche. Fifty or 100 years the trade of the country to the [illegible] was carried over this route, but since the Canadian Northern was pushed through to Edmonton about 1895 and the traffic now goes chiefly via Edmonton and Athabasca Landing.

SOIL.

The soil throughout the country varies very much. That a considerable part of it would be unsuitable for agriculture is certain, but a great deal of it, perhaps the greater part, is good. Along the Churchill, with the exception of a few miles at the mouth of Beaver River, the soil is light and sandy, with a large proportion of rock. Lac la Ronge is a beautiful lake, with a fine sandy beach on the west side, and is bordered with sandy clay spots. Northeast of Montreal Lake the soil is still light, but larger areas occur more frequently, and at Lac la Ronge rock outcrop is met with. There are of course fertile spots where the soil is deep and rich, but no large compact area of land occurs in the northeastern part of the area explored, except at Stanley, where, perhaps, 6 or 8 square miles of arable land may be found in one block. To the west of Lac la Ronge though rock outcrop continues, fertile spots occur more frequently. All at Trout Lake there is no sign of rock. The soil around Trout Lake is light and rather sandy, muskegs occur frequently until Snake Lake is reached. Sandy River flows through a large hay meadow, bounded on the west by a muskeg or peat bog, extending westerly to Lac Ile a la Crosse. The hay meadow varies in width from one quarter of a mile to three miles. Wherever a good hay might be cut along this river. The whole country between Snake Lake and Ile a la Crosse Lake, a distance of 30 miles, there are few locations in it except along the shore of the lakes or rivers. On the west side of Ile a la Crosse settlement there is practically no land that at present [illegible] cultivation, the country being all low and almost a muskeg. I explored this side pretty thoroughly for a distance of about 60 miles and found it to be practically all the same, and almost the same level as the lake. Along what is termed Deep River, connecting Ile a la Crosse Lake and Little Buffalo Lake, the banks are higher and the land good, but this is only a fringe along the river, seldom extending more than half a mile inland. These muskegs could, of course, be easily drained.

The soil around Buffalo Lake is light, but appears to be fertile. It is generally a light loam rather inclined to be sandy, with a sandy subsoil. In some places the soil is much heavier and is very fertile. La Loche River flows through an immense swamp, which extends for miles on each side, no ridges being even in sight. At La Loche Lake the soil is very much better, being a heavy loam varying from 18 inches to almost any depth. Once the height of land at Portage la Loche is crossed on the portage, the whole country towards the west takes on a far better aspect, and the soil appears to be as good as could be desired.

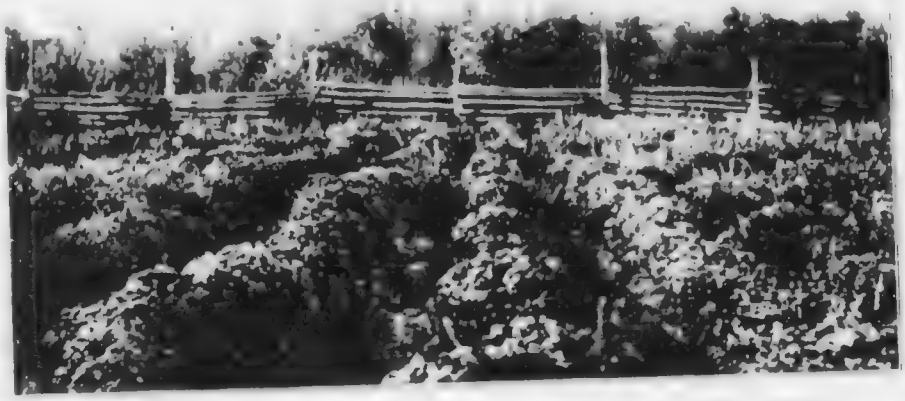
TOPOGRAPHICAL FEATURES.

The topography of this tract varies very much as one travels south. In the most southerly portion, on the west side, along the valley of the Beg River, the country is broken by deep coulees, and the prairie is rolling with round topped hills, admirably suited for ranching; farther north it becomes flat and low. In the northern part of the tract it is all flat, very few ridges occurring. In this latter country the construction of roads would not be easy as swamps occur frequently. Winter roads of course might be built in almost any direction by simply clearing the way.

CLIMATE.

The climatic conditions appear to be most favourable. The expression "Frozen North," sometimes used, is a misnomer. Of course the winter is cold but

...ate colder or lower than the water in some of the settled portions of ... Saskatchewan. In August 1908 a frost occurred almost all over the settled parts ... Saskatchewan but did not appreciably affect the northern portion which I ... Locally the frost may have been bad but it was certainly not felt all ... I was not in the district at the time but the first frost registered by my ... recorder was on October 2nd, when the thermometer fell to 24 degrees F. ... at Portage la Loche on September 17th and the potato tops were not frozen ... frost.



POTATOES AT MOUTH OF BUFFALO RIVER, SEPTEMBER 12TH, 1908.

The garden was also quite untouched. Cabbages, carrots, parsnips, etc., all ... well. Nor had I seen any frozen vegetables on the way up. At La Plonge ... the wheat was touched, but it was grown close to the river and caught any ... there could have been. The vegetables in the garden here were quite un... ... a hoe of a well on September 4th, the tomatoes had been removed from ... ... frost might come.

The lakes began to freeze on October the 20th, but remained open for perhaps ... the weather running quite mild again. There was not sufficient snow ... sled, dogs until November 20th, and even then there was very little. ... was not deep until about December 15th.

The rainfall in this district is ample, though not excessive, and its uniformity ... is a valuable feature. As far as I could learn the heaviest rains ... the early summer just when rain is most needed for agricultural operations. ... fall is not generally heavy, seldom exceeding 18 inches and as with the ... uniform.

RANCHING

Along the Big River in the southern portion of the tract, is a splendid ranching ... Hay abounds and water and shelter are easily obtained. The country ... partly open, dotted with bluffs of poplar, and hay is to be had everywhere. ... grass cures here and the rolling hills would be blown clear of snow which would ... a winter range for stock almost equal to the Porcupine Hills in Southern

Alberta. Farther north however the country is too flat and at Portage la Loche is reached. The valley of Clearwater River below Portage la Loche would furnish a cattle range that in a few years would be hard to beat.

VALLEY OF THE CLEARWATER LOOKING WEST FROM THE HEIGHTS
[illegible]

I am informed that there is even a better cattle range in the valley of the Pembina River, southwest of Portage la Loche, but I did not see it. [illegible]

HAY

[illegible] I travelled there was an abundance of hay and along the main [illegible] [illegible] [illegible]

BEAVER

The method used in beaver hunting is well known and needs no description here. The reader is referred to Samuel Hearne's description in his account of his great inland journey from Ft. Churchill 1769 to 1772. The method of that time has not changed. Suffice to say that wherever a beaver lodge is found the occupants are exterminated. Their house being broken, those not caught are destroyed as it is impossible for them to build again that winter. The principal time for beaver hunting is in January or February when other kinds of fur are not prime. Last October I saw a beaver lodge in the course of completion on the Peace River, a tributary of Lake Ile à la Crosse, and I spent the better part of a day watching the beaver working. In November I was again in the locality, but some persons had found the location and the lodge was broken. I am told that a few years ago beaver abounded around Green Lake, but this year I saw none there at all.

WINTER CAMP NEAR CANOE LAKE

The pay in trade for a prime made beaver now is 12 lbs. of sugar or its equivalent. At one time made beaver was the standard value, hence the term "skin" as used in trading, everything being priced at so many skins.

Moose are plentiful
Marten are rare
Muskrat abound
Rabbits are scarce at present
Squirrels are not too plentiful

FISH

The staple food of the native north of the Saskatchewan is fish and with this they are amply supplied. White fish abound in all the lakes and rivers. Pike is common to perfection we have the white fish as well as pike and whitefish. Canoe Lake is also amply supplied. Canoe Lake, Marten Lake and all the lakes where I encountered the pickerel are well stocked with this delicious food. As to the value of white fish as a food I cannot express myself better than to quote Sir John Richardson's encomium as his opportunity for an opinion was of the best. "The [illegible] in any North Country

who has left a more valuable scientific record of his observations than Sir John Richardson who was associated with the Sir John Franklin Overland Arctic Expeditions. He says:

"Several species of this subgenus (Coregenus) have been celebrated for the delicacy of their flavour but none have been more justly so than the Attihawmeg which is an inhabitant of all the interior lakes of America from Erie to the Arctic Sea.

"Several Indian hordes mainly subsist upon it and it forms the principal food at many of the fur posts for eight or nine months of the year the supply of other articles of diet being scanty and casual. Though it is a rich fat fish instead of producing satiety it becomes daily more agreeable to the palate; and I know from experience that though deprived of bread and vegetables one may live wholly upon this fish for months or even years without tiring."

Fauna Boreal Americana III, page 195, 1836.

Pike or Jack fish are equally as widely distributed as white fish though not so numerous and of course are not so valuable for food. It should be remembered, however, that the pike of the northern waters is a very much finer fish than the fish we know under the same name. Along Churchill River, which is really more like a series of lakes than a river, there are occasionally shallow lakes or bays of the river which contain only pike or Jack fish. Doré, or the English equivalent pickerel are caught in places notably at Doré Lake. Doré, as this fish is always called by the natives is a very fine fish. Mr. E. [illegible], Assistant U.S. Biological Survey, speaking of Doré says:

"It is an excellent food fish but of course must yield the palm in this regard to the unsurpassed white fish with which it is associated."

Page 544, Vol. 2, *Contributions to Forestry*, No. 27. "A biological investigation of the Athabaska-Mackenzie region", 1908.

TROUT.

The only variety of this fish I saw or heard of is lake trout. This species is found in Clear Lake, Lac la Ronge, and some other smaller lakes. Speaking of this fish Preble says: "In the larger bodies of water, lake trout frequently attain a weight of 50 pounds and occasionally even more. They are caught in large numbers and furnish a rich and nourishing food, but cannot be eaten steadily as they soon pall upon the appetite."

Vol. 2, *Contributions to Forestry*, No. 27, page 510.

LOCAL

Local lakes and rivers, and in fact along all the several routes of travel in the north country, from the unprejudiced stranger's point of view, the local fish are the most important. This fish is found everywhere, particularly in the [illegible] waters.

The [illegible] fish to a great extent resembles white fish but is not much used as food. Preble says about it: "There are no sturgeon in the district. About [illegible] miles above Fort Portage on the Churchill River there are [illegible] the Indians [illegible] where the [illegible] stop. No sturgeon [illegible] above this. [illegible] waters of the Churchill [illegible] this fish would be [illegible]. At Lac la Ronge [illegible] as elsewhere. The [illegible] fish are [illegible]. The [illegible] fish are [illegible] at Montreal Lake [illegible] the [illegible]. [illegible] laws and [illegible] to [illegible] these valuable food fish [illegible] at [illegible] settlements, when such arrive, [illegible]."

TIMBER.

Although numerous prairie openings occur this tract may be spoken of as practically covered with small timber not generally of any commercial value. The poplar is the principal growth; and, following the rule so well known throughout the western prairie country, indicates good land. Some spruce is found and large quantities of small second growth jack pine. There is some tamarac. There is of course no white or red pine. The poplar in some places would make fine pulp-wood or barrel staves. Generally speaking it is of no commercial value. There are several small groves of good spruce along the Churchill River, and at Portage la Loche there is a large quantity of good spruce. Along the White Fish River the timber is large and of good quality. On both the east and west side of Green Lake some good timber is found but it is scattered. Generally there is ample timber for settlers' use but not enough to supply any lumber industry.

SAWMILL AT R. C. MISSION, LAC LA PLONGE. RUN BY WATER POWER.

While on this subject I with to call attention to the destruction of timber by fire. Large areas of good merchantable timber at one time existed in this district but they have long since been destroyed by repeated fires.

I posted fire notices wherever I went, but they were printed in English which the natives cannot read. Fire notices have now been printed in Cree Syllabic, and notices in these characters are intelligible to all the natives of this district. I have forwarded a number of copies of these latter notices to fur-traders, missionaries and others with the request that they should post them in conspicuous places.

MINERALS.

North of the Churchill lies a district of great promise from a mineral point of view. Already prospectors have pushed into this district as far north as Cree Lake and to make many more will be in the district this year. It is important that all prospectors in this country should use their utmost endeavour to prevent forest fires. While there is little doubt of there being mineral deposits of value, it should be remembered that the existence of timber for mining purposes, for railway construction and even to make the country habitable for man might easily be the deciding factor as to the economical development of the mineral wealth.

On the east side of the tract rock outcrop occurs and numerous claims have been staked at Lac la Ronge on the Churchill River in the vicinity of Stanley. I did not visit the prospect in this tract. I saw several specimens of ore from the different claims. As Mr. McInnes of the Geological Survey was through this country

this year. I did not stop to investigate. His report, when published, will cover it. At Buffalo Lake there is a small tar sand outcrop. Whether it will ever be of commercial value or not I cannot say. This is apparently of the same character as the famous tar sands of Athabaska and Clearwater farther west. Prospectors are going farther north this year. Some of the prospectors who have been on the north shores of Great Bear Lake report encouraging indications of copper and silver. The country looks like a mineral country, but it is not yet prospected.

It would be impossible to say definitely at present whether the claims at La la Ronge will be valuable or not, but the owners are energetic prospectors, and capital in development work. There is one shaft now being sunk to a depth of 70 feet. Several interested parties have been on the ground, and expect to have a number of men at work there this year.

THE GRAND RAPIDS ON THE SLAVE RIVER, NEAR HEAD OF STEAMBOAT NAVIGATION.

WATER POWER.

Throughout this district there are many points where the development of water power could be developed, and there are indications of small powers.

Power carried without necessarily reducing the pressure, as is done in the United States, it is not overstating that the power now going to waste in this

...get might be utilized so as to create great industrial centres. The great ad... ...ge of the numerous water powers is the fact that sufficient power can be ...ned at many points to supply the needs of a fair sized community. On almost ...y stream there are sites where small powers could be easily developed and ...e mills, saw mills, lighting and pumping plants could be operated at the min... ...y at expense. I did not gauge or measure the possibilities of any of the ... powers but made rough estimates of a few prominent ones. On the Beaver ...r at what is termed Grand Rapids probably 10,000 h.p. could be developed

On the La Plonge River half a mile from its junction with the Beaver River, ... Roman Catholic missionaries have a small saw mill operated by water power ... power is also used to pump water into the large mission school and a electric ... plant is being installed. The Rapid River, which enters the Churchill about ... below Stanley, falls 70 feet in one cascade. This should afford a large amount ... power.

The Churchill River between He a la Crosse Lake and Knee Lake, a distance ... twenty-five miles, has a fall of 80 feet. This fall is practically all in ... rapids all of which have sharp descents. At one rapid there is a descent ... feet. The power possibilities here would be large but I fancy it would be more ... to cut out the development of the district to blow some of these rapids ... to increase the navigable facilities.

All the tributaries on the north side of the Churchill afford ample opportunity ... development of power. Mudjatick River is a series of waterfalls, so much so ... Indians travelling from He a la Crosse to Cree Lake prefer to use the somewhat ... route by Clear Lake than to face the strong current and numerous portages ... more direct route.

I did not travel along the Churchill River all the way from Knee Lake to Stanley ... the numerous rapids along it are well known. I am informed that in ... portion of the river there are five portages caused by water falls or rapids ... to preclude safety of descent.

I am indebted to Mr. William McInnes, M.A., of the Geological Survey for the ... description of rapids occurring farther down the Churchill and on Montreal ...

GEOLOGICAL SURVEY

R. W. Brock, Acting Director.

Department of Mines,

Ottawa, April 21st, 1909

While making track surveys of the Churchill and Montreal Rivers last summer ... estimates of the heights of the rapids as follows:

CHURCHILL RIVER

...t taken at foot of Reindeer River, ½ a mile long, by barometer	15 feet
Kettle Falls, 4 miles above influx of Reindeer River, ¼ mile long, by barometer.	17 feet
... Rapids, head of Island Lake, ¼ mile long, by barometer.	16 feet
... 2 chains long, by barometer	7 feet
Rapid at foot of Drinking Lake, 6 chains long, by barometer	9 feet
Pine Rapid, 2 chains long, by barometer	7 feet
Grave Rapid, 1 chain long, by barometer	5 feet

MONTREAL RIVER.

Near mouth in ½ mile rapid, by barometer	15 feet.
At 70 chain portage, by barometer	45 feet.
At 2½ mile portage, by barometer	165 feet.

There are many other rapids in Montreal River, but these seemed to have the greatest pitch.

Sgd. WILLIAM McINNES.

In subdividing the district into sections in order to more minutely describe the country it is difficult to determine where boundaries should be placed, but I have been governed as much as possible by natural features.

GREEN LAKE SECTION.

Attached here to make is a plan marked "B" showing the approximate boundaries of what I term "the Green Lake section."

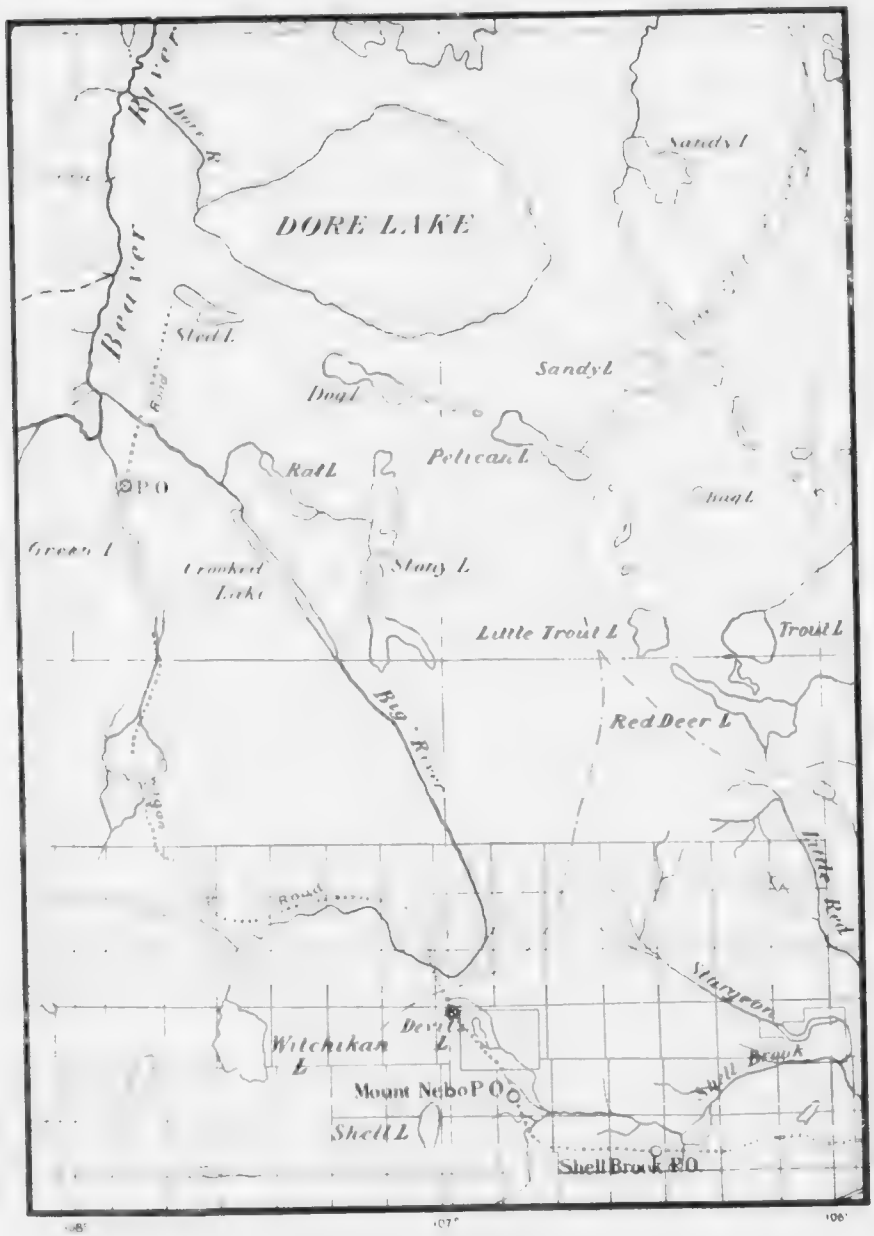
This section forms the southeasterly portion of the district and is separated from the rest of same by country extending about 40 miles north-west of Prince Albert by a sandy belt and some large swamps.

AT THE LEIGHT DEPOT AT SOUTH END OF GREEN LAKE.

The country is covered with a dense growth of poplar, occasionally small groves of good spruce occur, and here and there one sees a few species of considerable size. There are some open prairie spots which yield abundant hay. These openings are, I fancy, dried up beaver workings along Crooked River. These openings occur frequently making the country suitable for cattle grazing. I passed here about the 15th of December on my return trip and saw stock grazing. This country is almost all good land and it extends easterly to the height of land between Montreal River and Beaver River. This height of land is well defined. There is a very long chain of lakes between the white fish on each side—those on the east side being, in most of the lakes, made island, while those on the west side are very large. The ordinary maps give one a very erroneous idea as to the

areas in all our Northern Country. In the Green lake section numerous ...s are found not shown on the published maps and all contain excellent white ...

PLAN "B"



GREEN LAKE SECTION.

Scale 20 miles=1 in.

At Sled Lake, which lies about twenty-five miles northeast of Green Lake and connected by water route, a native Cree half-breed, named Baptiste Morasty has a good log house, stables, boat and other buildings, and grows successfully vegetables and oats. The lake is about ten miles long, and varying from one half to two miles in width, and as stated it is good land and there might be located here a company prospecting settlement of farmers. Through the land is covered with a thick growth of timber, mostly poplar. Several lumber shanties have been built both the Hudson's Bay and Revillon's have a timber permit here. About 14 miles southeast of Sled Lake is Dog Lake, also about ten miles long, and surrounded by excellent land. Pelican Lake, about 18 miles long and 2 miles wide, which is about ten miles southeast of Dog Lake. Here a native named Louis Vallee lives and trades for Revillon Freres. Vallee has a good vegetable garden. There are very large hay meadows here, but as Vallee has no stock he does not cut any hay. Moose are plentiful around this lake. There are considerable stretches of good land surrounding this lake. On the north of Pelican Lake are some other large lakes, which I did not visit, but which I have been informed by Indians and others are connected with Beaver and Montreal Rivers. Montreal River passes about four miles east of Pelican Lake, and is a rapid stream navigable for canoes. The land along the eastern slope of this water shed is of good quality. Pelican Lake appears to have an outlet to the south into Deer Lake, but I have not verified this. The whole country around Pelican Lake has been burned over at one time or another, and from the appearance of the second growth timber it must have been destroyed.

For a distance of about [illegible] miles southeast of Pelican Lake the timber has been cut for saw logs, and [illegible] years ago a large mill was operating.

Owing to the fact that I was compelled to start back at this point in order to reach the end of the season's work, I was unable to explore the country further.

Such is a brief description of the country in this section and its agricultural possibilities. Assuming a small area of say 160 acres equal to one quarter section, I have selected as particularly good land to represent a fair average. Such a patch of land, several reports from which I have before me, would show the following estimate of acreages:

Good [illegible] pasture	8 acres
Good [illegible] land	80 acres
Hay land, not to [illegible]	15 acres
Hay land, [illegible]	20 acres
Muskeg, [illegible]	10 acres
Muskeg, [illegible]	10 acres
Stony [illegible]	2 acres
Water, [illegible]	15 acres
	160 acres

An average 15,000 cords of good [illegible] might be cut on it, about 3,000 cords of poplar.

However, there are a great number of large and small lakes. The aggregate of land [illegible] as compared with the gross area would therefore be very much [illegible].

In the western part of the Green Lake Section there appears to be as much or more [illegible] than in the vicinity of Beaver River hay grounds. I did not go far enough to the west. The soil generally is a high loam covered to about 4 inches of [illegible] vegetation. The subsoil varies and is sometimes sandy clay, sometimes [illegible]. In places I have found a peculiar reddish, gritty soil which appears to be marvellously productive. Pea vine is abundant here and grows to about two feet in height. Game of all kinds abounds in the woods and fish in the lakes, and the native Indians and [illegible] living by catching fish and occasionally shooting a moose. Wolves are very numerous in this section and do a lot of damage to game. Fur is not plentiful except muskrats which are very numerous.

At and around the Hudson's Bay Company's Post on the south end of Green ... there is a considerable settlement of half-breeds. A Roman Catholic Mission established here. Revillon Freres have also a post. The Priest has a good ... having all kinds of vegetables; also has a small fruit garden growing ... gooseberries and raspberries also strawberries. These all thrive and ...

THE PRIEST'S OAT FIELD AT GREEN LAKE SETTLEMENT

Green Lake is important as a stopping place for freighters in winter and conse... large quantities of hay are stacked. Some oats and barley are grown, but ... effort has been made to farm. Father Teston of the Mission says that he ... oats and barley for fifteen years in succession and so far has not had a ... I interviewed a native named Morin, who said that he had grown potatoes, ... barley in small quantities for 35 years and could not recall having ever ... failure. He has never kept a record of when he sowed or when he harvested, ... has the Reverend Father. Morin owns thirty-five head of cattle and twelve ... horses. He has sown wheat on six or seven occasions and it always ripened. ... opinion there is no doubt that wheat could be raised anywhere in the locality. ... Green Lake goes out early and it is generally very late before it freezes. ... summers are always warm and there is ample rain. The gardens, which I saw ... were certainly fine although they were not cared for as they should have been. ... were allowed to grow in profusion

ILE A LA CROSSE SECTION

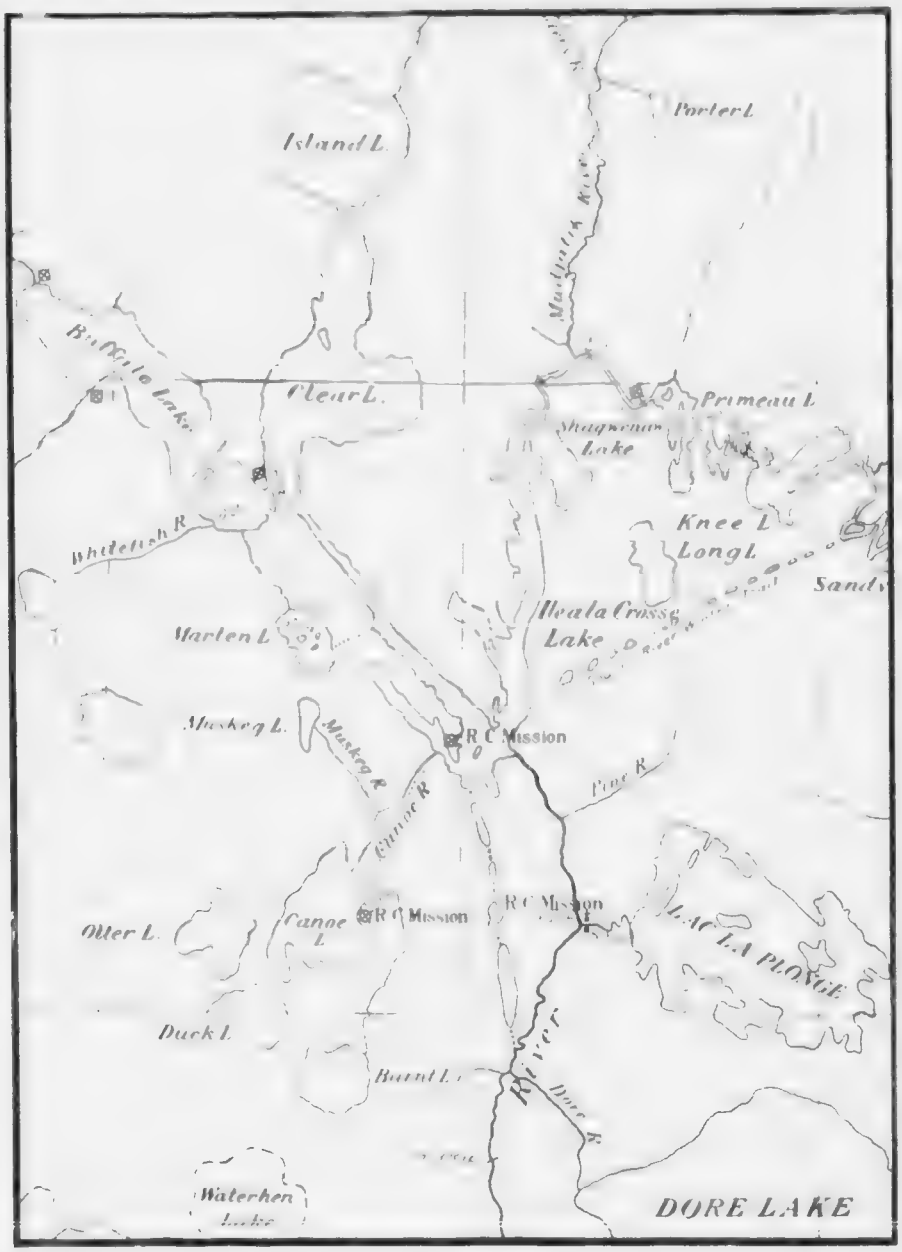
Attached hereunder is a plan marked "C" shewing the approximate bound... what I term "Ile à la Crosse Section"

This section is by no means so good from an agricultural point of view as the ... Lake Section. Nevertheless it is capable of considerable agricultural de... to sustain a fair population, and though there are some limited areas ... land along the shores of lakes and rivers the general character of the tract ... swampy and the natural drainage will have to be considerably improved ... any large area available for settlement.

Ile à la Crosse Lake, Buffalo Lake and Clear Lake are practically all one body ... No current is noticeable in what is called "Deep River" connecting Ile ... Crosse Lake and Clear Lake, it being simply a protracted narrows of these lakes ... immense body of water may be taken as the head waters of the Churchill River.

[illegible]

Page 10



ILE A LA CROSSE SECTION.
Scale 20 [illegible]

WHEAT AT LA PLONGE MISSION, SEPT. 11TH, 1908

The main building of the Mission is the school. It is a frame building three [illegible] high and 120 x 60. All the Mission buildings are painted and look well. The priest has a good house. Another house is used by the lay brothers. There

are large and well appointed stables all the horses wintered on the spot. The school is not quite finished inside, but as the Mission has only been two years in existence the amount of work accomplished is extraordinary.

Here too I saw oats, wheat and [illegible]

OATS AT LA PLONGE MISSION, SEPT. 4TH 1908.

The wheat was a first attempt, but will be tried on a much larger scale this year. The small patch sown last year must have been put in late in the spring. It appeared well matured, but frosted: this I fancy was due to its being planted close to the river. The priest has cleared a good sized patch, perhaps about 10 acres which he intends sowing in wheat. The oats were splendid and grew to a great height. The vegetables were especially good. The variety astonished me. Almost every vegetable was represented and appeared to thrive. Potatoes, cabbage, cauliflower, lima beans, green peas, carrots, turnips, onions, lettuce, beets, parsnips, and tomatoes, all growing splendidly. I never saw a better garden, and indeed I don't remember seeing as good in the West. This garden is indicative of what can be done.

The land around the Mission is all good and easily cleared as it is covered with poplar. There is no large body of timber here but good spruce logs are found

among the poplar. In the photo of the saw mill given herewith, some

Supper in the only kind of sea [illegible] Lawson is very scarce. There

of wood suitable for [illegible] It might be [illegible] that this was

[illegible] spot selected by the mission [illegible] as [illegible] the eye. What

[illegible] could be done at a number of places in the [illegible] The priest

[illegible] at [illegible] opinion. He [illegible] La Crosse was better adapted to farming than [illegible]

[illegible] at La Plonge. The mission [illegible] removed from there two years ago.

[illegible] the priests have a very nice church and a comfortable dwelling

[illegible] three acres ploughed and [illegible] in addition. At

[illegible] Bay Company's Post which is their farthest distributing point there is

[illegible] and last year about [illegible] were [illegible] The company

[illegible] to [illegible] and the Revillons have opened roads for winter

[illegible] to be a [illegible]

[illegible] [illegible] $1.00 per [illegible] this price was considered

[illegible] worth everybody's [illegible] The Hudson's Bay Company

[illegible] and the native being almost entirely a [illegible] hunter, looks on

[illegible] with contempt. The Revillon Post at [illegible] is their district

[illegible] Mr. Lee Museum in the Department Government Canadian Pacific Railway.

[illegible] 1877 [illegible] I was at [illegible] September 22nd 1875 and saw

[illegible] that were in July. I was told by Mr. Cunningham that these

[illegible] were killed by frost in September. Here there was a [illegible]

[illegible] horsepower and I am told that all kinds of [illegible] per [illegible]

[illegible] Canoe River is a small patch of good land. At Canoe Lake

[illegible] also a small Roman Catholic Church and at our post

Hudson's Bay Company.

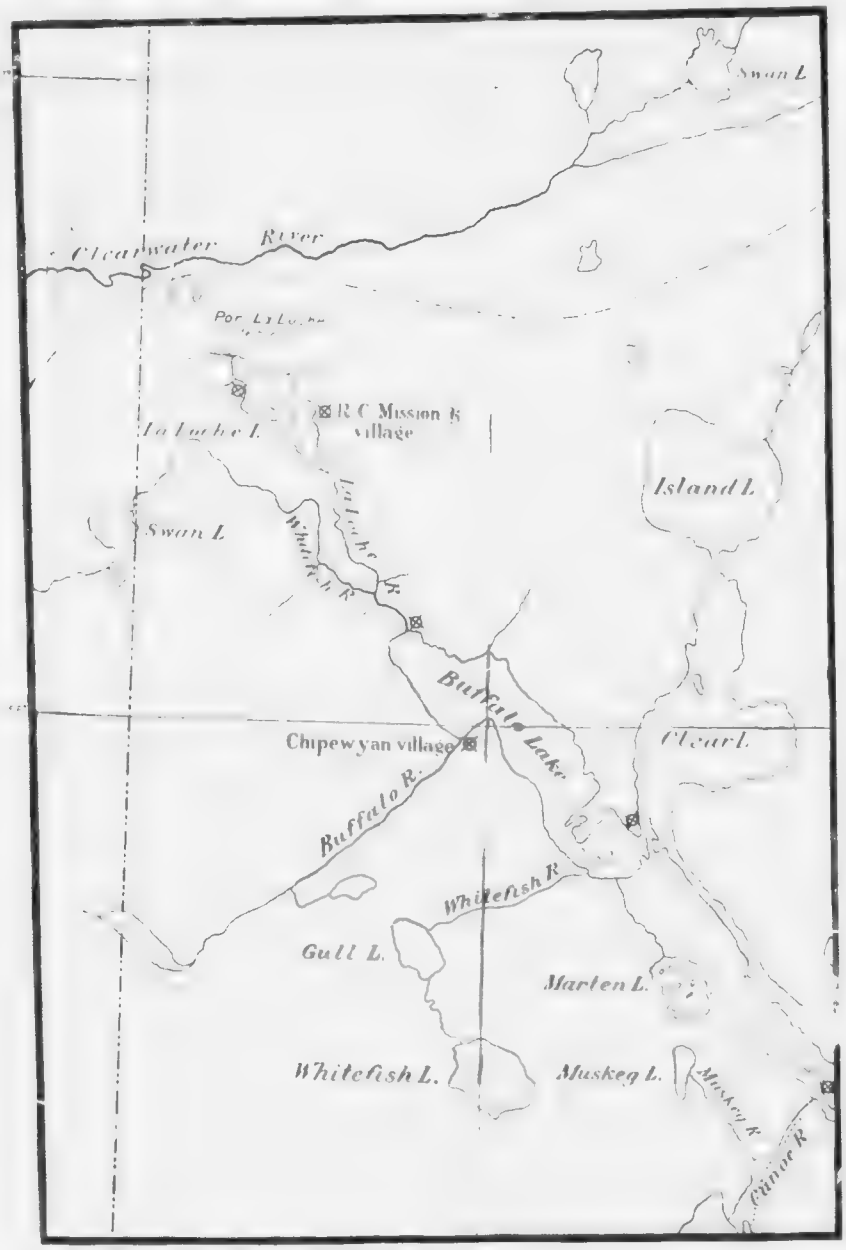
GARDEN AT BUFFALO RIVER, SEPT. 12TH, 1908

From [illegible] to Canoe Lake the river flows through immense hay [illegible] and there was a large amount of hay stacked but of a rather poor quality, [illegible] slough grass. At Canoe Lake the land is somewhat higher and there were [illegible] good gardens. The Chipewyans grow some barley but cut it too soon. At [illegible] south-west of Canoe Lake the country rises considerably and the soil is good.

[illegible] [illegible] [illegible] [

large clearing and the situation is most picturesque. A large growth of merchant-
[illegible] forms a background which adds considerably to the appearance of

PLAN "D"



PORTAGE LA LOCHE SECTION.

whole. A garden of about one acre is fenced with a rail fence. This garden splendidly on the 17th of September. The potato tops were not touched

by frost. The Hudson's Bay Company abandoned this route to the Mackenzie about the time of the Riel Rebellion in 1885

THE HUDSON'S BAY COMPANY'S PORTAGE LA LOCHE POST

The [illegible] to the north on Portage la Loche is [illegible] Portage la Loche post and at Buckeye Lake at the source of La Loche River [illegible] Bay. Hudson's Bay Company Chief's [illegible] In 1897 [illegible] to the Yukon, and the Hudson's Bay Company re-opened this once famous portage. The view from the top of the Portage looking west, of which a cut is given earlier in this report, has been enthusiastically described by many travellers. The valley of the Clearwater River would [illegible] and leads to a [illegible] country. There are large open prairies, and the grass is splendid. Vetch and [illegible] I was greatly impressed with the Clearwater Valley as quite similar to the North Saskatchewan Valley. The soil is a good loam with [illegible] I had ample opportunity to observe it carefully as the whole place in the vicinity of the Portage is pitted with prospect holes. The heavy woods [illegible] Sir Alexander Mackenzie in his "Voyages from Montreal through the Continent of North America to the Frozen and Pacific Oceans, in 1789 and 1793," says of the Clearwater Valley:

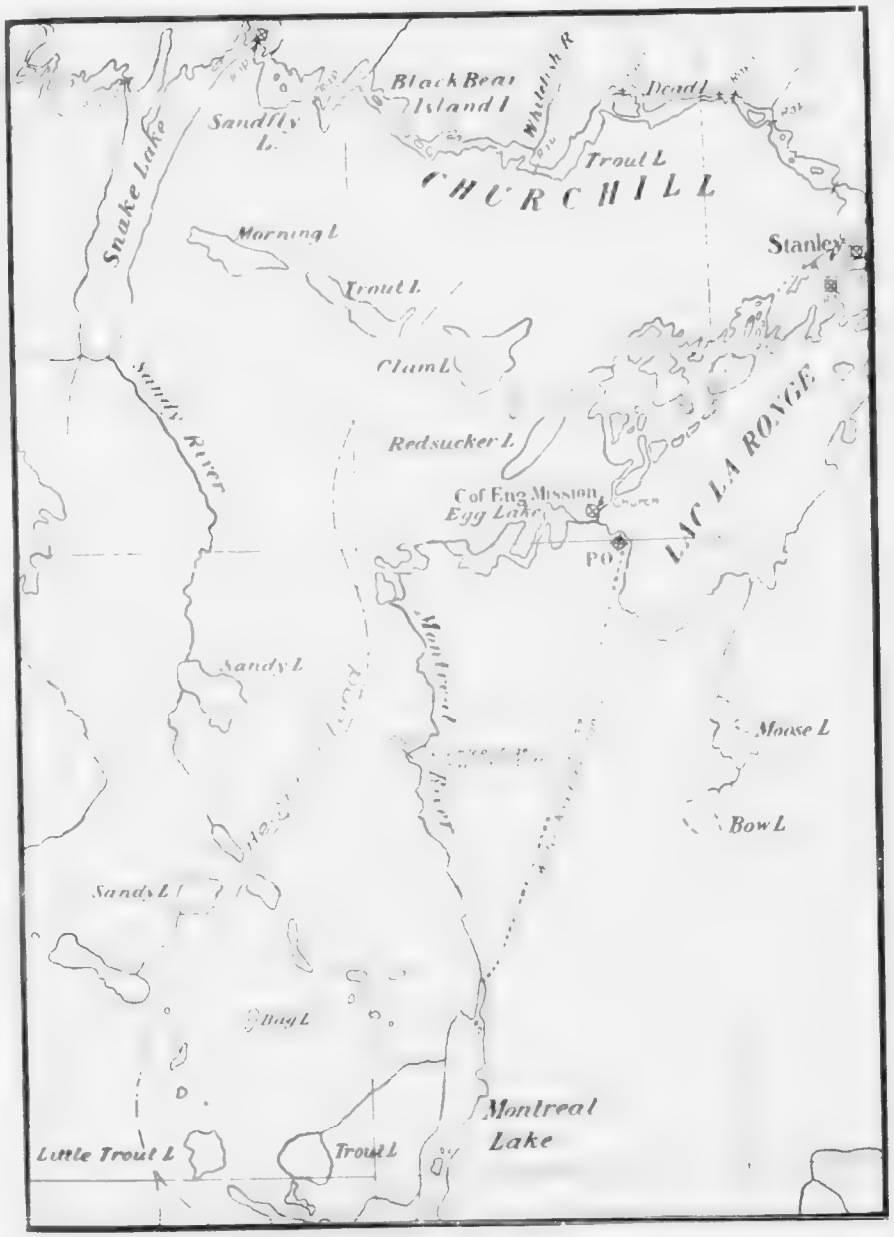
"The Valley is about three miles in breadth and is confined by two lofty ridges of equal height, displaying a most beautiful admixture of wood and lawn, and stretching on until the blue mist obscures the prospect. Some parts of the inclining heights are covered with stately forests, relieved by promontories of the finest verdure, where the elk and buffaloes find pasture. These are contrasted by spots where fire has destroyed the woods and left a dreary void behind it."

From conversation with the natives, the priest and the Hudson's Bay Company's manager, I feel sure that the climate here would be quite favourable to wheat raising. I am informed by the residents that this section is not affected by early frosts and the gardens which I saw certainly bear out their statement. John O. Groat, the Hudson's Bay Company's manager at Portage la Loche post informs me that he has heard from Indians that the Valley of the Pembina River is still a better country as the prairies are larger. This valley lies to the south-west of the Clearwater of which the Pembina is a tributary. In the matter of collecting information here as in other sections I met the same difficulty, that though I was informed that crops had been grown successfully I could not ascertain particulars as to the extent of the crop or the yield per acre. In fact, no detailed information could be obtained.

SNAKE LAKE AND SANDY RIVER SECTION.

Attached hereunder is a plan marked "E" shewing the approximate boundaries of what I term "Snake Lake and Sandy River Section"

PLAN "E"



SNAKE LAKE SECTION.
Scale 20 miles 1 in

There has not been any settlement at any place whatever in this section. Along the Churchill River below Otter Rapids there is no trail. I had to make my own trail. There is no settlement whatever in this section. It is partly heavily wooded and partly open and fair bearing grass. The country is supposed to be a favorite resort for wolves. I travelled through it for about two months and heard of the dogs but I did not see any wolves.

The bridge across the Churchill River at Otter Rapids is not a very substantial one. It is built of logs and is not very wide. The bridge has been burnt off in several places and is covered with rather rotten planks. A poplar growth is springing up now.

This part of the Section cannot be called good agricultural country. There is, however, a vast area of swamp in this section. I suppose it could be drained. Sandy River flows through part of the meadows. These are not too wet and are not mere swamps. Of course most of the meadows would be improved by clearing of scrub and brush. About 60 miles east of Stanley I got the best rock exposures met with. Here the country becomes somewhat rougher. There are some ridges of good stone along the Churchill River in this section. I did not estimate the amount, but I consider that it would be sufficient to supply the large monastery.

At the mouth of Sandy River, on Stanley Lake, there are two or three families of Indians. They have no permanent residence, but usually camp in a certain locality, which is convenient to the fishing and hunting grounds. Beaver were plentiful here. I saw several beaver houses, but the Indians had made arrangements to call at the beaver houses as the weather was colder.

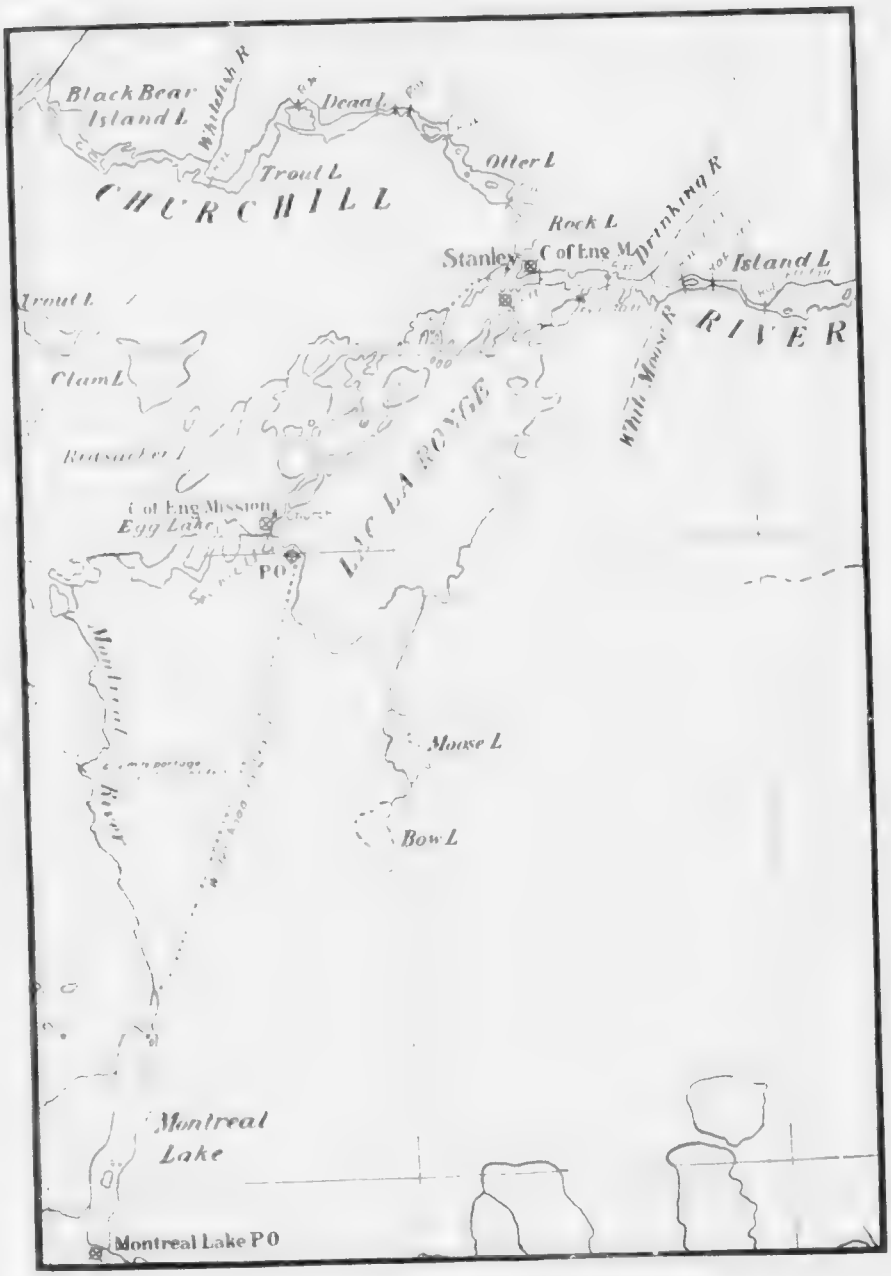
There are several rapids on Sandy River. Another river also flows into Stanley Lake from the south. The Indians call it Two Dogs River. This section is difficult to get at as the canoe routes are not good for the direction. Coming from Ile a la Crosse via the Churchill several long rapids must be portaged. Via La Plonge Lake the La Plonge River is practically all rapids; perhaps the easiest route is from Lac la Ronge, even then there are many long portages.

LAC LA RONGE AND STANLEY SECTION.

Attached hereto under is a plan marked "I" showing the approximate boundaries of what I term the "Lac la Ronge and Stanley Section."

Lac la Ronge District is claimed to have great possibilities as a mineral district. The Laurentian range of rock crops out here and is easily traced to the northwest. Whether this outcrop really contains mineral of economic value is still unsettled. Numerous claims have been staked at Nickel Island in Lac la Ronge and on the mainland close by, also on the Churchill River above Stanley. I had not time to prospect the country, but from casual observation I should think that it would repay a close investigation. The vein on Nickel Island is very distinct and about 18 inches wide on the outcrop. Several small companies have been formed and development work in a limited way is progressing. Besides the mineral wealth supposed to be available there is also considerable land to be found capable of being tilled. It is no experiment to endeavour to raise wheat in this section. It has already been done. Stanley, or as it is sometimes called Stanley Mission, is worthy of special description. It appears that Stanley is one of the best known spots in the north. The village or settlement is situated on a most picturesque point jutting into the Churchill River. The country surrounding it is rolling and this adds considerably to the beauty of the locality. From an agricultural standpoint the land is good. The soil is a rich loam and the subsoil is sandy clay. The loam however, attains a great depth. I put one hole down almost four feet and had not then struck a sub-soil. This, however, was exceptional. Stanley's fame rests altogether on the energy and initiative of Rev. Mr. Hunt, a Church of England clergyman, and the founder of a Church of England Mission there about 1851. Mr. Hunt, as far as I could ascertain, not only built the celebrated and beautiful church, but also planted some wheat and barley.

PLAN "F"



LAC LA RONGE SECTION.

Scale 20 miles 1 in.

he found would grow successfully and he established a small mill to grind the ... At first he used a hand mill, which is still standing at the Mission House; ... on, however, he built a small water power mill and for a number of years

this was in operation, used not only by the Mission but also by the Hudson's Bay Company. In a diary kept by the Hudson's Bay manager at Stanley, I saw an entry, 27th of September, 1879, or thereabout:—"Myself and William Rat went to the mill with six bushels of barley, but there was no one there." Archdeacon McKay was at that time in charge of the Mission. I looked over the diary of that year to find entries of seeding or harvesting, but without avail

CHURCH OF ENGLAND AT STANLEY MISSION.

In April, or the beginning of May (the diary was not always dated, entries being made without them) he speaks of ploughing, also in the fall, but no mention of seeding, except of sowing potatoes, of which he says:—"William Rat planted two bushels of potatoes to-day;" again, "Donald McKenzie spent the day spreading manure on the south field." Undoubtedly farming was carried on here, but to what extent, seems lost history. Archdeacon McKay in his evidence in Ottawa in 1907, before the Senate Committee, said he grew wheat for seven years without being frosted, but apparently gave no details of when, or how much.

At Lac la Ronge, on the north shore of the bay at the south-west end of the lake, the Church of England Mission have a large school not yet completed, and

also an open-air saw mill. The Rev. Mr. Brown is in charge of the Mission and is endeavouring to establish a farm in order to teach the natives to work. He has some cattle, pigs and poultry. Rev. Mr. Brown has a good garden, nothing in it suffering from frost. At Little Hills, just at the mouth of Montreal River, wheat has been grown successfully and Mr. Brown intends putting in a crop this year. I might here be permitted to say that the Rev. Mr. Brown, who is materially assisted by his wife in his Mission work, is deserving of the most unstinted praise for his zeal and industry in the building up of the Mission. Under somewhat disadvantageous circumstances he fills the several positions of Minister of the Gospel, farm instructor and mechanic to his flock, cheerfully and with good effect.

The Hudson's Bay Company had a good garden last year, but most of the ground here is stony. Revillon Frères have a post here and they, too, raise all the vegetables they require. All the residents of this section expect that it will develop into a great mineral country. I heard that coal has been found close to here, but I could not find where. This rumour of coal is persistent and may be true. At Stanley, I was struck by the freshness of the paint on the church and was surprised to hear that it has only been painted once, sometime about 1861. This paint is in two colours, red and yellow, and is made from some pigment found here, mixed with fish oil. I had not time to search for the pigment as no one seemed to know whereabouts it was, but I was certainly astonished at its weather-resisting properties.

Fur at Stanley was perhaps a little more plentiful than elsewhere, but furs are scarce everywhere just now. Quite a few beaver were killed here as in other places. Moose are plentiful around Stanley, but not so at the south end of Lac la Ronge. Whitefish in Lac La Ronge are not good, but very large trout are to be found. They are caught up to thirty-four lbs., twenty lbs. is a common size.

MONTREAL LAKE SECTION.

Attached hereunder is a plan marked "G" showing the approximate boundaries of what I term the "Montreal Lake Section."

As we enter this section we approach a better known, although sparsely settled section. The road from Montreal Lake to Prince Albert is travelled considerably and is, I understand, fairly good in winter though almost impassable in summer. There is a considerable body of timber at the south end of Montreal Lake, but it is on the Indian Reserve. The land on the east and west shores is swampy. To the north there is considerable good land, but no farming has been done there so far. On Deer Lake just east of the narrows a white man lives and he has a first-class garden. Around Deer Lake the land is good and I see no difficulty in its development. Fish in this locality are not generally good, but some lakes afford fine fish. Considerable fishing is carried on by Prince Albert firms. Both the Hudson's Bay and Revillon Bros. have posts at the south end of Montreal Lake, and some fur, notably rat, is obtained. Fine furs are scarce. I did not travel to the east of Montreal Lake, but from information obtained there is not any great difference in the country or soil from the west side.

The soil at Deer Lake is a good light loam, inclined to be sandy with a blue clay sub-soil. Muskegs occur, but they are generally small. There is ample hay everywhere. I fancy this country might profitably be surveyed and opened for settlement.

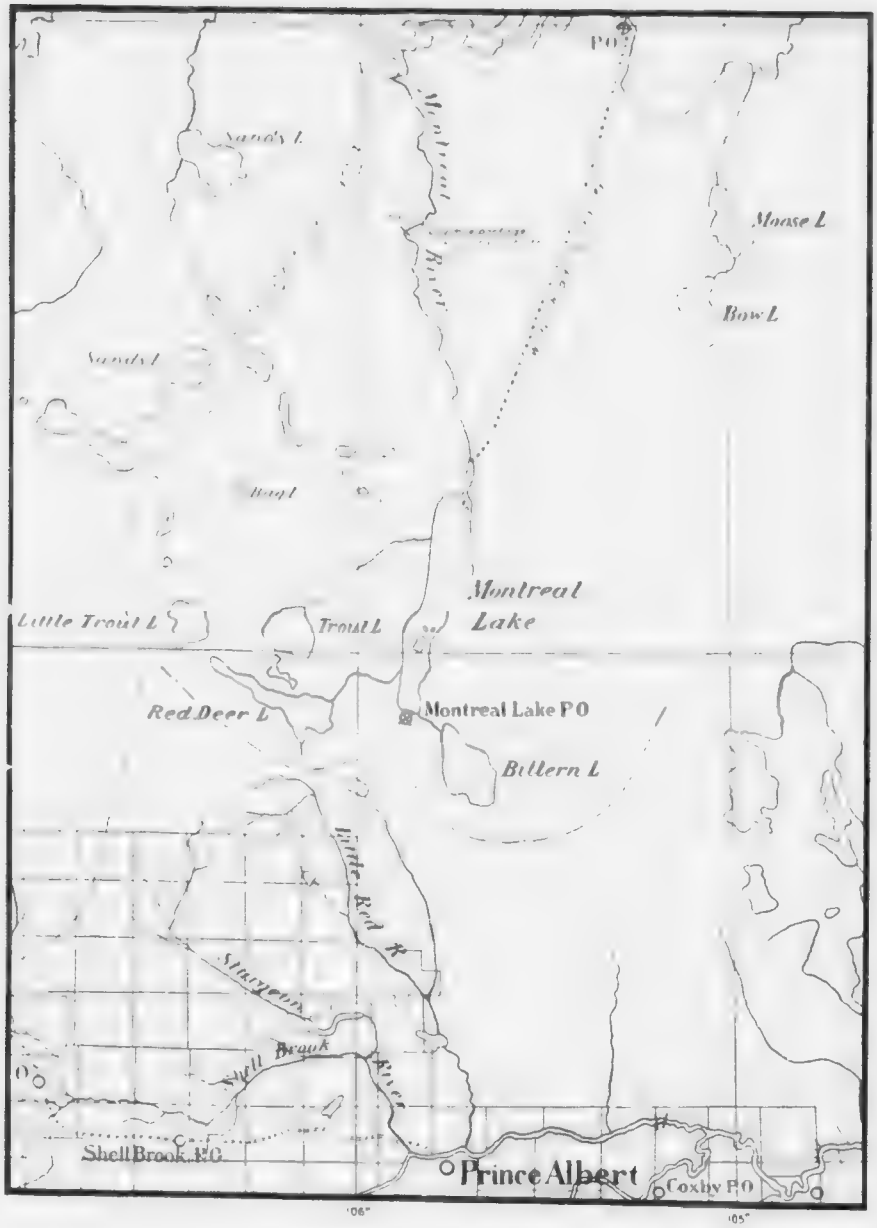
I have the honour to be,

Sir,

Your obedient servant,

FRANK J. P. CREAN, C.E.

PLAN "G"



MONTREAL LAKE SECTION.

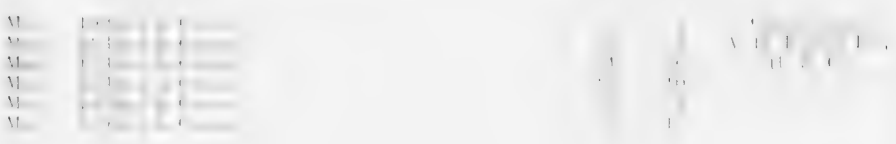
Scale 2 miles = 1 in.

Table referred to near beginning of this report, showing temperatures taken at certain points.

Date	Place or Observation	Weather	Max.	Min.	Remarks
Aug.	27 South end of Green Lake	Showery		43	Observed by myself.
Aug.	28 Northeast of Green Lake	Fine		43	
Aug.	29 Northeast of Green Lake	Rain		40	
Aug.	30 Northeast of Green Lake	Fine		42	
Aug.	31 Northeast of Green Lake	Showery		40	
Sept.	1 Northeast of Green Lake	Fine		42	
Sept.	2 Beaver River	Fine		57	
Sept.	3 Beaver River, east La Ronge	Showery		48	
Sept.	4 Beaver River, south of Green Lake	Fine		40	
Sept.	5 Ile a la Crosse	Windy		43	"
Sept.	6 Ile a la Crosse	Fine		40	
Sept.	7 Ile a la Crosse	Fine		39	
Sept.	8 Ile a la Crosse	Windy		57	"
Sept.	9 Deep River	Fine		40	
Sept.	10 Buffalo Narrows	Fine		42	
Sept.	11 Buffalo Lake	Windy		36	
Sept.	12 Buffalo Lake, near La Loche River	Fine		37	
Sept.	13 Methye Portage, La Loche River	Fine		42	
Sept.	14 La Loche Lake	Fine		40	
Sept.	15 H B Post, La Loche	Rain		38	
Sept.	16 H B Post, La Loche	Rain		46	
Sept.	17 H B Co. Post, La Loche	Fine		40	
Sept.	18 La Loche Lake	Fine		34	
Sept.	19 Buffalo Lake	Windy		42	
Sept.	20 Buffalo Lake	Windy		34	
Sept.	21 Buffalo Lake	Windy		46	
Sept.	22 Deep River	Windy		35	
Sept.	23 Ile a la Crosse	Fine		34	"
Sept.	24 Ile a la Crosse	Fine		40	"
Sept.	25 Ile a la Crosse	Fine		42	"
Sept.	26 Ile a la Crosse	Fine		40	"
Sept.	27 Ile a la Crosse	Cloudy		36	"
Sept.	28 Ile a la Crosse	Rain		35	"
Sept.	29 Ile a la Crosse	Fine		40	"
Sept.	30 Ile a la Crosse	Fine		40	"
Oct.	1 Ile a la Crosse	Cold, wind		34	"
Oct.	2 Ile a la Crosse	Cloudy		34	"
Oct.	3 Ile a la Crosse	Windy		30	"
Oct.	4 Ile a la Crosse	Fine		36	"
Oct.	5 Ile a la Crosse	Windy		38	"
Oct.	6 Ile a la Crosse	Cloudy		28	"
Oct.	7 Canoe River	Fine		30	"
Oct.	8 Canoe River	Fine		27	"
Oct.	9 Mustang River	Fine		26	"
Oct.	10 Mustang Lake	Fine		14	"
Oct.	11 Mustang River	Fine		24	"
Oct.	12 Ile a la Crosse	Fine		18	"
Oct.	13 Ile a la Crosse	Windy		28	
Oct.	14 Ile a la Crosse	Cloudy		25	
Oct.	15 Ile a la Crosse	Cloudy		27	
Oct.	16 Ile a la Crosse	Rain		21	
Oct.	17 Buffalo Narrows	Fine		20	"
Oct.	18 Buffalo Lake	Windy		20	"
Oct.	19 Marten River	Fine		14	"
Oct.	20 Marten Lake	Snowing		6	"
Oct.	21 Marten Lake	Storming		4	"
Oct.	22 Deep River	Storming		8	"
Oct.	23 Ile a la Crosse	Fine		16	"
Oct.	24 Ile a la Crosse	Fine		20	"
Oct.	25 Ile a la Crosse	Fine		20	
Oct.	26 Ile a la Crosse	Fine		15	
Oct.	27 Ile a la Crosse	Fine		18	"

Date	Place of Observation	Weather	Max.	Min.	Remarks
Oct.	28 Ile a la Crosse			1	Observed Ex moon
Oct.	29 Ile a la Crosse				
Oct.	30 Ile a la Crosse				
Oct.	31 Ile a la Crosse			1	
Nov.	1 Ile a la Crosse		4	2	Observed by
Nov.	2 Ile a la Crosse		4	2	A. H. Brown, Esq.
Nov.	3 Ile a la Crosse		4	2	H.B.Co.
Nov.	4 Ile a la Crosse		13	4	
Nov.	5 Ile a la Crosse		19	3	
Nov.	6 Ile a la Crosse		17	24	
Nov.	7 Ile a la Crosse		11	24	
Nov.	8 Ile a la Crosse		8	12	
Nov.	9 Ile a la Crosse		20	12	
Nov.	10 Ile a la Crosse		24	10	
Nov.	11 Ile a la Crosse		25	11	
Nov.	12 Ile a la Crosse		25	17	
Nov.	13 Ile a la Crosse		18	8	
Nov.	14 Ile a la Crosse		23	13	
Nov.	15 Ile a la Crosse		25	12	
Nov.	16 Ile a la Crosse		24	12	
Nov.	17 Ile a la Crosse		21	10	
Nov.	18 Ile a la Crosse		22	30	
Nov.	19 Ile a la Crosse		22	21	
Nov.	20 Ile a la Crosse		24	12	
Nov.	21 Ile a la Crosse		23	13	
Nov.	22 Ile a la Crosse		24	12	
Nov.	23 Ile a la Crosse		24	14	
Nov.	24 Ile a la Crosse		23	20	
Nov.	25 Ile a la Crosse		23	14	
Nov.	26 Ile a la Crosse		23	17	
Nov.	27 Ile a la Crosse		23	10	
Nov.	28 Ile a la Crosse		24	18	
Nov.	29 Ile a la Crosse		24	4	
Nov.	30 Ile a la Crosse		24	5	
Dec.	1 Ile a la Crosse		19	25	
Dec.	2 Ile a la Crosse		15	24	
Dec.	3 Ile a la Crosse		17	24	
Dec.	4 Ile a la Crosse		17	23	
Dec.	5 Ile a la Crosse		19	15	
Dec.	6 Ile a la Crosse		12	17	
Dec.	7 Ile a la Crosse		17	12	
Dec.	8 Ile a la Crosse		21	11	
Dec.	9 Ile a la Crosse		20	4	
Dec.	10 Ile a la Crosse		10	3	
Dec.	11 Ile a la Crosse		26	3	
Dec.	12 Ile a la Crosse		41	20	
Dec.	13 Ile a la Crosse		37	17	
Dec.	14 Ile a la Crosse		16	1	
Dec.	15 Ile a la Crosse		14	19	
Dec.	16 Ile a la Crosse		11	15	
Dec.	17 Ile a la Crosse		9	11	
Dec.	18 Ile a la Crosse		30	15	
Dec.	19 Ile a la Crosse		25	9	
Dec.	20 Ile a la Crosse		26	10	
Dec.	21 Ile a la Crosse		29	9	
Dec.	22 Ile a la Crosse		29	11	
Dec.	23 Ile a la Crosse		29	9	
Dec.	24 Ile a la Crosse		27	13	
Dec.	25 Ile a la Crosse		27	3	
Dec.	26 Ile a la Crosse		15	10	
Dec.	27 Ile a la Crosse		15	5	
Dec.	28 Ile a la Crosse		17	10	
Dec.	29 Ile a la Crosse		11	10	
Dec.	30 Ile a la Crosse		5	22	
Dec.	31 Ile a la Crosse		4	23	
Jan.	1 Ile a la Crosse		10	3	
Jan.	2 Ile a la Crosse		15		

Date	Place of Observation	Weather	Max	Min	Remarks
	Ile a la Crosse			5	Observed by
	Ile a la Crosse		16	6	A. H. Pease, Esq
	Ile a la Crosse		13	12	H.B.C. Co.
	Ile a la Crosse		10	10	
	Ile a la Crosse		13	16	
	Ile a la Crosse		14	8	
	Ile a la Crosse		12	6	
	Ile a la Crosse			10	
	Ile a la Crosse			4	
	Ile a la Crosse			6	
	Ile a la Crosse		0	9	
	Ile a la Crosse		13	13	
	Ile a la Crosse		11	10	
	Ile a la Crosse		10	8	
	Ile a la Crosse			6	
	Ile a la Crosse			12	
	Ile a la Crosse			13	
	Ile a la Crosse			10	
	Ile a la Crosse			10	
	Ile a la Crosse			10	
	Ile a la Crosse			17	
	Ile a la Crosse		13	15	
	Ile a la Crosse			9	
	Ile a la Crosse		9	10	
	Ile a la Crosse		10	17	
	Ile a la Crosse		12	12	
	Ile a la Crosse			17	
	Ile a la Crosse				
	Ile a la Crosse		2	13	
	Ile a la Crosse		1	17	
	Ile a la Crosse		12		
	Ile a la Crosse			15	
	Ile a la Crosse		3	20	
	Ile a la Crosse		10	30	
	Ile a la Crosse		11	12	
	Ile a la Crosse			5	
	Ile a la Crosse			33	
	Ile a la Crosse		3	30	
	Ile a la Crosse		14	8	
	Ile a la Crosse		1	5	
	Ile a la Crosse		3	6	
	Ile a la Crosse		10	5	
	Ile a la Crosse		4	10	
	Ile a la Crosse		3	10	
	Ile a la Crosse		5	20	
	Ile a la Crosse		13	10	
	Ile a la Crosse		29	10	
	Ile a la Crosse		23	4	
	Ile a la Crosse		29	5	
	Ile a la Crosse		15		
	Ile a la Crosse		4	34	
	Ile a la Crosse		8	15	
	Ile a la Crosse		15	5	
	Ile a la Crosse		13	10	
	Ile a la Crosse		10		
	Ile a la Crosse		18		
	Ile a la Crosse		19	5	
	Ile a la Crosse		30	10	
	Ile a la Crosse		34	10	
	Ile a la Crosse		32	10	
	Ile a la Crosse		34	10	
	Ile a la Crosse		30	10	
	Ile a la Crosse		29	10	
	Ile a la Crosse		20	2	
	Ile a la Crosse		15	3	



RESULTS OF SEED DISTRIBUTION.

KANAKA OATS AT ENGLISH MISSION, BAY OF ROSSEL.

POTATOES AT ENGLISH MISSION, BAY OF ROSSEL.

PRESTON WHEAT FIELD, STANLEY, CHURCHILL RIVER.

THE REPORT OF 1909

LETTER OF INSTRUCTIONS

RAILWAY LANDS BRANCH, DEPARTMENT OF THE INTERIOR,

OTTAWA, May 18th, 1909.

FRANK J. P. CREAN, ESQ., C.E.,
Ottawa, Ontario.

DEAR SIR:—It is the Minister's desire that you should proceed without delay to Prince Albert, Saskatchewan, to carry on your exploration of the country north of the surveyed area in Saskatchewan and Alberta and extending west from the territory covered last year.

You will be expected to cover as much of the country west to the Athabaska and north to the Clearwater as time will permit. It is not expected that you will be able to extend your exploration this year into the district north of the Clearwater and east of the Athabaska; but any information you can obtain about it from the Indians or half-breeds you come in contact with should be carefully noted.

Mr. A. M. Beale, of the staff of this Branch at Ottawa, will accompany you as assistant. Owing to the accident which Mr. W. R. Caldwell met with last year I regret to say that he will not be able to accompany you; but in Mr. Beale you should find a capable assistant.

I am enclosing you a copy of my instructions to you of last year, and which you are to follow this year in respect of the conduct of your exploration and the character of the information you will be expected to gather.

You will also furnish a copy of these instructions to Mr. Beale for his guidance.

R. E. YOUNG,
Superintendent

TRANSPORT LEAVING PRINCE ALBERT.

NEW NORTHWEST EXPLORATION, 1909

OTTAWA, May 2nd, 1910.

To the

HONOURABLE FRANK OLIVER,

Minister of the Interior, Ottawa.

SIR,—I have the honour to report on my exploration during the season of 1909.

By the foregoing letter of instructions to me, dated May 18th, 1909, and signed by Mr. R. E. Young, D.L.S., Superintendent of Railway Lands, I was to make an exploration of that part of Saskatchewan and Alberta which lies to the north of the surveyed area and is otherwise bounded by Green Lake, the Beaver River and connecting waters to Portage la Loche, thence down the Clearwater to the Athabaska, and thence up the Athabaska to the north limit of the surveyed area at township 68.

In compliance with the above instructions, I left Ottawa for Prince Albert on May 25th, having purchased canoes, etc. At Prince Albert, owing to the lateness of the season, I had much difficulty in procuring teams to transport my outfit to Green Lake, as farmers were all busy at their crops.

I left Prince Albert on June 17th, 1909, completed my season's work at McMurray, and thence proceeded to Edmonton, reaching there December 11th, 1909.

Mr. A. M. Beale, B.Sc., my assistant, proved himself capable and energetic. His work was good, both in the field and in the compilation of the map which accompanies this report.

Besides my assistant, I took with me from Prince Albert five other men, namely, T. G. Street, F. T. O'Meagher, J. Brown, H. Rosson and G. Martin (cook). Mr. Street remained with me until I returned, and I have much pleasure in testifying to his efficiency and endurance.

STEEL BRIDGE ACROSS THE SASKATCHEWAN RIVER AT PRINCE ALBERT.

At Green Lake I launched my canoes which had been somewhat damaged in transport; however, I was able to repair them.

[illegible] I travelled principally by canoe, making numerous portages, some of [illegible] mile's length. On some occasions I hired horses and used them as a [illegible]

[illegible] approximately 21 million acres.* Of this tract not over 2 [illegible] 4, [illegible] [illegible]

OBSERVING FOR TIME WITH A SEXTAN.

10 million acres. The greater portion of the remaining area, say 9 million acres, could be drained, and, in my opinion, would well repay the expenditure. Throughout the tract there is ample fall which would allow of drainage being successfully carried out. A portion of the tract lies on the head waters of the Churchill River, and all the streams contain numerous rapids and falls.

On the west side of the height of land sloping towards the Athabaska and the Clearwater there are also excellent facilities for drainage. This tract is well supplied with timber, some of which may be suitable for export.

* Of [illegible] approximately 34 [illegible] seasons 1908-09 is approximately 31 [illegible]

In estimating the area of land available in its present state for agriculture, I must wish to be understood that it is in one large tract, but that 10 million acres in large and small tracts out of the total is capable of producing crops, which with ... would make a comfortable livelihood. The land is almost entirely ... growth of small poplar. There are some open places and a good deal ... I will, however, refer to this when dealing in detail with the tract.

The character ... prevailing throughout offers no obstacle to farming, ... have been ... attempted they have always ...

In the matter of ... agriculture the fact that there is no demand for ... produce in the north prevents people who live there from carrying on ... experimental work. Wheat has been grown successfully at McMurray, which ... the most northerly point touched by me. Here, too, all the ordinary ... grown in the more southerly portions of the Province are grown with the ... success.

The difficulties of transportation to reach this section and also to reach the ... and fertile valley of the Clearwater will no longer exist when the railway ... McMurray, which is now proposed to be built, is completed.

As in the former season, no attempt was made to accurately survey the route travelled, but some of the large lakes were traversed by micrometer survey, and ... observations were taken at numerous points of geographic interest. Sketches were made of the topography, and distances estimated.

The setting in of winter found me at Portage la Loche, and from there I continued my journey with dog trains.

The 4th Meridian of the Dominion Land System of Surveys, and which is the ... between the Provinces of Saskatchewan and Alberta, was surveyed by Mr. J. N. Wallace, D.L.S., during the season of 1909, from the south side of Cold Lake in township 63, to the north limit of township 80. As I was endeavouring to cover as much as possible of the country allotted to me to explore in the season of 1909, I did not extend my observations into the vicinity of the 4th meridian, ... in the compilation of this Report I have had before me advance notes of Mr. Wallace's Report and have shewn the topography of the country along and in the ... of the 4th Meridian from his survey notes. Mr. Wallace's Report will ... information in detail of the country through which his line was run and will ... published in the Annual Report of the Department of the Interior.

ACCESS.

There are four routes which have been used more or less to reach the tract ... which I have explored.

1. The road from Prince Albert to Green Lake has been commented upon in ... report of last year, and very little improvement has been made in it. It is a ... route to travel in its present state, but might, in my opinion, be ... improved. The portion which follows the Big River needs grading in several places. ... the road passes through the timber approaching Green Lake it should be ... wider to give the sun a chance to dry the mud holes. The Provincial ... of Saskatchewan has lately improved the grade of the hill at Green ... I understand, but this had not been done when I was there. From Green ... the waterway is good for canoes, or for boats, as far as Bull's House on Buffalo ...

To travel up the Beaver River from the confluence of the Green River with ... Beaver is not difficult. Some small rapids occur, but poling up them is easily ... accomplished. There is a waggon road from Green Lake to Meadow Lake, but it ... impossible to travel over it at all seasons of the year. The Meadow River, ... very tortuous, is navigable for canoes or small boats. Around Meadow ... the roads are good and horses can be used for considerable distances in all ...

2. The new road from Battleford to Meadow Lake I am not able to speak of ... personal observation, but I am informed that though almost impassable in ... it is quite good in winter.

(3). The road to Lac la Biche from Edmonton is much travelled and is a good highway. There is also, I am informed, a good road from Athabaska Landing to Lac la Biche; the country north of Lac la Biche north is not travelled except in winter, there being no waterway. Some adventurous sports have travelled by pack train from Lac la Biche to Portage la Loche, but I have not heard very much from a highway.

(4). The fourth means of access is by the Athabaska River from Athabaska Landing to McMurray. I did not travel over this route, but it is well known, and has been accurately described to Mr. Ellis Stewart, late Superintendent of Lands,

TAR SAND EXPOSURE ON THE ATHABASKA
NOTE THE HEIGHT OF THE MAN
NEAR THE WATER

try, in his report of 1906, and by many others. It is not a good route, and is somewhat dangerous to those who do not know the river. The railway to McMurray from Edmonton, which is now being surveyed, will of course take the place of the river route.

MINERALS.

Tar-Sand.

No outcrop of mineral of any kind, with the exception of tar-sand, was noticed in the district which I explored.

The interest taken in this peculiar mineral has of late been very keen, and is probably increased by the prospect of a railway entering this district. Regulations for acquisition, etc., of this mineral from the Crown have been issued by the Department of the Interior, and are to be found in the Appendix.

The out-crop of tar-sand commences about 30 miles south of McMurray on the Athabaska River. It continues to about 40 miles below McMurray on the Athabaska River. It extends to the east and west for at least 30 miles, and varies in thickness from 20 to 225 feet, with probably an average of 150 feet thickness, according to the Geological Survey Report of 1893. The enormous quantity of this mineral has been variously estimated, and in the Report of the Geological Survey of last season a great deal of useful information is recorded concerning it. Copies of this report may be had on application to Dr. Brock, Director of the Geological Survey, Ottawa.

Tar-sand is spoken of by many different names. Some object to the name "tar-sand," holding that it does not contain tar. This objection cannot possibly be sustained, as it does contain a very high percentage of mineral tar, or pure bitumen.

"Asphalt," or "Asphaltum," is another name frequently applied to it. This is hardly correct, although it does contain a percentage of asphalt or bitumen.

According to an analysis made by Dr. Hoffman, late chemist to the Geological Survey of Canada, of a specimen of this substance collected by Dr. Bell, also late of the Geological Survey, it was found to contain:

Bitumen	12.42 per cent
Water (mechanically mixed)	5.85 "
Siliceous sands	81.73 "

Dr. Hoffman found that the sand consists of grains of pure vitreous quartz, suitable for the manufacture of the finest white glass (Report of the Geological Survey, 1880-1882, part H., page 5). As the tar-sand itself burns freely if supplied with sufficient air, we have both the silica and fuel for glass making. In its native state, with little or no refining, it may be used as an asphalt mastic for paving, roofing, electric insulation and other purposes. No artificial mixture of similar components can excel the natural combination of fine sand and bitumen which it affords.

As to the quantity of material available, Mr. R. G. McConnell, in his report published by the Geological Survey in 1893, says:

"A cubic foot of the bituminous sand rock weighs, according to Dr. Hoffmann, 117.5 lbs. This figure multiplied by the percentage of bitumen 12.42 gives 14.59 lbs. as the amount of bitumen present in a cubic foot, or $\frac{14.59}{63.76} = 22.90$ per cent. in bulk. Taking the thickness at 150 feet, and assuming the distribution as given above at 1,000 square miles, the bituminous sands in sight amount to 28.40 cubic miles. Of this mass, if the preceding analysis is taken as an average, although it is probably rather high, 22.90 per cent. in bulk, or 6.50 cubic miles is bitumen. The amount of petroleum which must have issued from the underlying limestones to produce 6.50 cubic miles, or by weight approximately 30,000,000,000 tons of bitumen, cannot now be estimated, as the conditions of oxidation and the original composition of the oil is unknown. It must, however, have been many times greater than the present supply of bitumen."

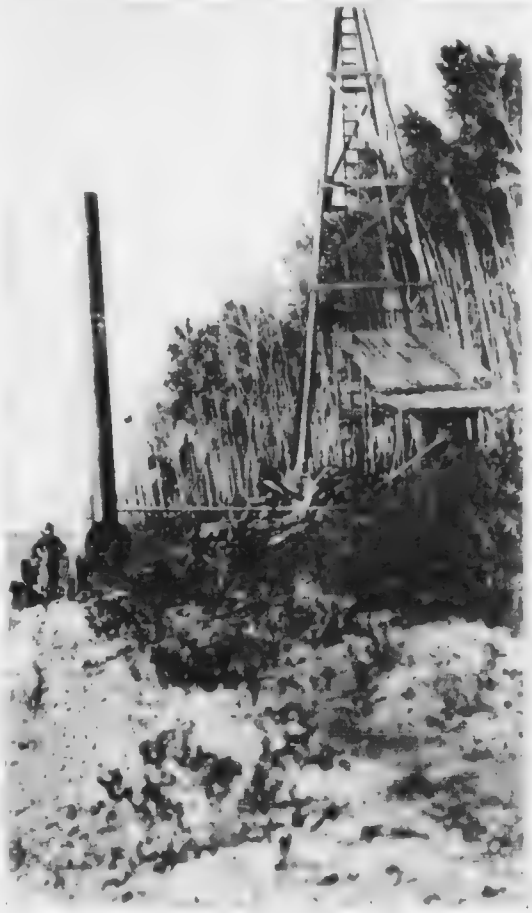
From the above, it would appear that this deposit of tar-sand, or asphalt, or pure bitumen, is the largest of its kind in the world.

The most famous deposit of asphalt is that of the pitch lake in Trinidad, West Indies. Speaking of this deposit, the Bulletin of the Imperial Institute, Vol. 1, 1903, page 51 and the following pages, describes the appearance and chemical formation of the pitch lake, and also of the country surrounding it, which is more or less bituminous. It says:—

The total amount of asphaltic bitumen in the outcrop cannot be proved [illegible] owing to the great extent [illegible] [illegible] [illegible]

PETROLEUM

Some attempt has been made to bore for petroleum in the districts where the [illegible] outcrops are, but it is the opinion of many geologists that the likelihood of finding any extensive deposit of petroleum is very great. The oil of Devonian Rock from which the petroleum came is to the north consequently it is likely that the large portion has long since flowed away. However Dr. Bell, in a paper read before the American Institute of Mining Engineers says: "In the petroliferous country to which the oil is believed, to be held under superincumbent strata in low arches or domes until the accumulation is punctured by an artificial boring. In the



OIL BORING MACHINE IN PLACE BEYOND MCKAY, LAT. 57° 09′; LONG. 111° 46′; TIMBER CUT IN LOCALITY, SPRUCE 18 FT. BY 18 IN.

[illegible]n in question several local anticlinals were observed in the beds of Devonian [illegible]estone and marl immediately under the tar-sands. Any accumulations of [illegible]roleum which may still exist at greater or lesser depths in the limestone, or in [illegible]mations underlying it, probably remain in such anticlinals and domes, the [illegible]angement of which may be quite independent of that of the overlying uncon-[illegible]sable tar-sands. The area of the deep-seated petroleum-bearing rocks being

large and the conditions varied it may be reasonably supposed that all the oil has not yet escaped, but that considerable quantities may still be encountered at various depths in some parts of the field."

It is the opinion of the best geological authorities that it would repay the money expended to bore for petroleum farther south, say in the locality of the Pelican River. Here the cretaceous formation over-lying the tar-sand is shallow and it is possible that an impervious shale may have retained large quantities of petroleum. The test hole put down by the Geological Survey at the mouth of the Pelican River, about 14 years ago, struck some petroleum, but the enormous outpouring of the natural gas froze the oil on the rod and prevented any further drilling.

Regulations relating to acquisition of Crown rights to petroleum and natural gas are to be found in the Appendix.

Experiments have been conducted lately by the Pumpherston Oil Company, Mid Calder, Scotland, in the treating of the oil shale of New Brunswick and Nova Scotia. These experiments were eminently satisfactory, and a valuable report of them is published by the Geological Survey under the name of "Joint Report on the Bitumen or Oil Shales of New Brunswick and Nova Scotia, also on the Oil-Shale Industry of Scotland," by R. W. Ells, LL.D., F.R.S.C. In this valuable report Dr. Ells says:—

"The celebrated tar-sands of the Athabaska River in Northern Alberta may at some time furnish material for distillation, since all attempts to find oil by boring have hitherto been unsuccessful. These tar-sands have been well described by Dr. Bell, and other officers of the Geological Survey who have visited the area. Dr. Bell, after describing the immense amount of tarry matter found along the river, states that the patchy sand itself may be useful for a variety of purposes. When chopped out of the bank in lumps like coal it was found to burn freely, with a strong smoky flame, it supported in such a way as to admit of the free access of air. As the bitumen became exhausted the fine sand fell to the bottom."

"A very superior lubricating oil may be manufactured from it. Dr. Hoffmann of the Geological Survey, Mr. Isaac Waterman, the well known petroleum refiner of London, Ont., and Lieutenant Cochrane, Instructor in Practical Chemistry at the Military College, Kingston, have found it to contain 12 to 15 per cent. of bitumen. Although this proportion may appear small, yet the material occurs in such enormous quantities that a profitable means of extracting the oil and paraffin which it contains may be found. The high banks of the river and its branches offer easy means of excavating it, and as it burns readily one part might be consumed to extract the oil from another, there being practically no limit to the quantities which may be obtained for the digging."

Dr. Bell, in a paper mentioned previously, before the American Institute of Mining Engineers, Toronto, July, 1907, says:—"Different experiments made with the tar-sands show that while they yield some good illuminating fluid, their principal value consists in the large proportion of fine lubricating oil which they afford. This oil was found to remain liquid in the cold winter temperatures of the Canadian Prairie Provinces, and therefore, it is very suitable for car wheels and machinery working in the open air."

Dr. Hoffmann found that 70 per cent. of the bitumen contained in the sand may be extracted in a fluid state by boiling it in water. The extracted oil rises rapidly to the surface and may be drawn off.

It does not seem that any difficulty would, therefore, be met with in the refining of bitumen from this substance and thereby rejecting almost 90 per cent. of crude material, and as previously stated, the silica contained in this tar-sand would be easily manufactured into the finest of white glass. The heat necessary for this manufacture being supplied by the tar-sand itself or from the natural gas which is so abundantly found in the vicinity.

It is quite possible that oil might be economically manufactured from this tar-sand in sufficient quantity to supply fuel for railways passing to the east towards the Hudson's Bay, where the coal supply would probably be scarce.

In conclusion, the uses to which this material may be put are numerous, and there is no doubt that once the transportation difficulty is overcome the material will be found extremely valuable.

The nearest railway point to Edmonton which is now served by the three great railway systems—the Canadian Pacific Railway, the Grand Trunk Pacific and the Canadian Northern Railway.

The distance from Edmonton to McMurray, at the centre of the tar-sand district will be something over 300 miles, but the country offers no serious difficulties to railway construction, and the railway will traverse some good agricultural country.

NATURAL GAS

The principal points where natural gas has been determined in Northern Alberta are at Little Buffalo River, below Grand Rapids on the Athabaska, the junction of Pelican River and the Athabaska, Athabaska Landing and on Tar Island, about thirty miles down the Peace River from Peace River Landing.

William Ogilvie, D.L.S., in his report of his trip in 1888 (Report of Department of the Interior, 1889) mentions an escape of natural gas on the Athabaska River, a short distance below Grand Rapids. He says "There is such a quantity of it that when ignited it will continue burning until the water rises and extinguishes the flame. The boatmen on the river use it to cook their meals."

In 1890, R. G. McConnell noticed the gas on the Athabaska at the mouth of Little Buffalo River below Grand Rapids. (Page 64, D. Vol. V., Part 1, Geological Survey Report, 1890-91). He says "Some of the jets burn steadily when lighted, until extinguished by heavy rains or strong wind and afford sufficient heat to cook a camp meal. . . . . On the Peace River natural gas issues in small quantities from the Tar Spring on Tar Island."

In 1894 a contract for boring for petroleum at Athabaska Landing was entered into by the Geological Survey with A. W. Fraser (Geological Survey Report, 1894, page 7a, Vol. VII). Mr. Fraser reported that "At 334 feet another large flow of gas was struck. The roaring of the gas could be heard a half-mile away from the works. . . . . My foreman, who had seen the big gas well at Kingsville, Ont., assured me that the flow of gas was as strong as in that well." The most remarkable flow of gas, however, that Mr. Fraser encountered was in 1897, when boring for oil at Pelican River. (Geological Survey Report, 1897, Vol. X, page 18a). "The flow of gas was so great," he says, "that a cannon ball could not have been dropped down the pipe. At 820 feet a tremendous flow of gas was struck, which blew every drop of water out of the bore. The roar of the gas could be heard for three miles or more. Soon it had completely dried the hole, and was blowing a cloud of dust 50 feet in the air. Small nodules of iron-pyrites, about the size of a walnut, were blown out of the hole with incredible velocity. They came out like bullets from a rifle. We could not see them going, but could hear them crack on the top of the derrick." Work was resumed here in 1898. (Geological Survey Report, Vol. XI, page 33a). It was thought that the flow of gas might have decreased, but on work being resumed and the hole being cleaned out the gas which had increased in power with the cleaning of the hole, cut the walls around and blew great clouds of sand and gravel higher than the derrick." Subsequently at 837 feet such a strong flow of gas was struck that they were obliged to suspend operations. He further says in the same report:—"I proved the general excellence and utility of the gas during the season, using it for my boiler, cook-stove and for lighting. I had only a 1-inch pipe, tapped into the side of the casing, and probably did not use the one-hundredth part of the gas coming from the bore, but there was sufficient to make all the steam necessary on my twenty-five horse-power boiler, keep fire in the stove, and also to supply a strong flare-light. The gas burned beautifully clean."

"In working at the bore, the screeching and hissing of the gas, when at all confined by the presence of the tools inside the casing, or from other causes, was great that the men complained of pains in their ears and heads."

"All that could be done was done to get the bore down the couple of hundred feet necessary to make a complete test in this place, and though failure was the result, it has, perhaps shown how a bore may be carried down seas to get through these extraordinary gas veins. To create success, a new bore at the depth of 820 feet, where the first large gas-vein was encountered, should be at least ten inches in diameter; then it would be possible to reduce the casing four or five times, giving that many different lines of pipe to be used in getting by these gas-veins.

"The bore also furnishes additional evidence of the existence in the North-West Territories of a vast gas-field. The seemingly uniform continuity of the cretaceous beds, makes it almost certain that gas-wells may be obtained by boring over a great area, as pointed out in the Summary Report of the Geological Survey for last year (pp. 18-19). Unfortunately the Pelican bore, like the boring at Athabaska Landing, did not penetrate deep enough to furnish reliable information as to the existence, or non-existence, of petroleum of a high quality.

VIEW OF A PORTION OF THE CLEARWATER.

TIMBER.

There is a great deal of fine spruce timber to be found in this district. In the more southerly portion of the eastern side, the timber is well known and is valuable, and is, I believe, included in what is termed the Cowan timber limit. North of Waterhen Lake I saw some very valuable timber. I could not arrive at a definite estimate of how much timber there is, but there must be a considerable quantity. Towards Ile a la Crosse the timber would afford a large amount of cordwood, and perhaps the poplar might be made into good barrel staves, but for the manufacture of lumber I do not think there is any timber in this locality. Along the Clearwater valley, both above and below the famous portage, there is found a large quantity of fine spruce. Groves of this timber are to be seen on the north side of this water as far as the eye can reach. Although I did not go north of the Clearwater River, on one of two occasions I touched the height of land, which runs close to the Clearwater River. From this eminence I found the surrounding country, which is very much lower on the north and west sides than on the south and east, timbered everywhere. Fires have burned in places, but there is still a vast quantity. South of McMurray towards Cowpar Lake one again meets with some very fine

spruce. Here the Indians have for many years sawn lumber with a whip saw. At Whitefish Lake there is a great deal of very fine tamarac, and here again the Indians saw their own lumber, manufacturing from it bob-sleighs, etc. I saw a bob-sleigh at Whitefish Lake made in its entirety by a half breed named Michel LeMaigre. It was an exact imitation of the ordinary bob-sleigh manufactured in the factories of Eastern Canada, and was made with primitive tools procured locally. LeMaigre had shod the runners with iron procured from the tires of an old wagon.

The timber continues of a fair quality, but with less frequency as one nears Lac la Biche, although here too, I understand, some fine timber is to be found.

AN OLD WAGON ON THE LONG PORTAGE (PORTAGE LA LOCHE). CONSTABLE THOMPSON AND GEORGE STREET.

I am indebted to Mr. R. H. Campbell, Superintendent of Forestry, for the following description and comparative values of the most common kinds of timber found in the north:

"(1). White Spruce (Picea Canadensis (Mill) B., S. & P.).

The wood is light, soft, not very strong, straight grained, light yellow, with hardly distinguishable sapwood. This is the best tree for lumber purposes in the northern forest, and is also one of the best for pulpwood. It usually grows on higher ground than the black spruce.

(2). Black Spruce (Picea Mariana (Mill), B., S. & P.).

The wood resembles closely that of the white spruce and as lumber or pulpwood no distinction is made between them. The wood has a slight red tinge and has paler sapwood. The black spruce grows usually in muskegs and low places and owing to the coldness of the soil does not grow fast and is usually small, not usually over 6 or 8 inches in diameter.

(3). Jackpine (Pinus Banksiana, Am.)

The wood is light, soft, not very strong, close grained and dark, nearly brown in colour, with light thick sapwood. This tree is used mostly for railway ties and fuel, but is manufactured into lumber to some extent. It is not equal in colour or smoothness to the wood of the spruce. It is used for pulp, but has not as fine a fibre or colour as the spruce.

(4) Tamarac Larix, Americana, Michx.

The wood is light brown, heavy, hard, strong, rather coarse grained and very durable. It is used for railway ties, posts and dimension timbers. It is not sawn into lumber, being more useful for other purposes and is not used for pulp.

5). Poplar, Aspen or White Poplar (Populus tremoloides, Michx.).

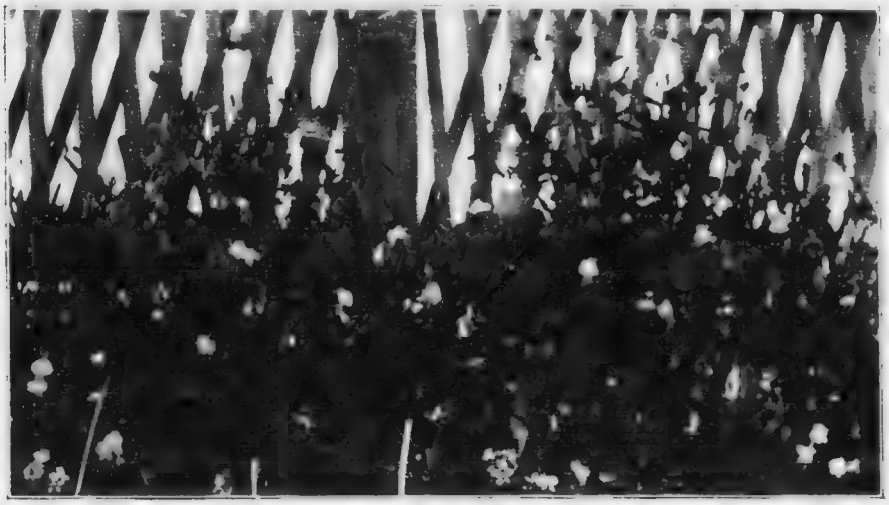
The wood is light brown with almost white sapwood. It is smooth and easily worked. It is used for pulp and is cut into lumber for inside finish. As it is a widely extended and quick-growing tree it is used largely for fuel. Next to the spruce it is the most valuable tree for pulp. It is manufactured largely into finer grades of paper by the soda process.

6). Balsam or Black Poplar (Populus balsamifera).

The wood is light brown, with thick sapwood. It is rather coarse and not strong. It is chiefly used for fuel, though sometimes cut into boards where other lumber is not available. It is not as valuable as the aspen poplar.

7. Birch (Betula papyrifera, Marsh.).

The wood is light, strong, tough, hard, very close grained, light brown, tinged with red, with thick, nearly white sapwood. It is used for spools, lasts and turned work generally. Birch fibre is short and brittle, and not easily bleached and is not suitable for pulp.



SWEET PEAS GROWING AT HEADQUARTERS POST. CONSTABLE THOMPSON OF THE SWAMP PLANTED A NICE LITTLE FLOWER GARDEN AT THIS POST. ALL THE FLOWERS GREW SUCCESSFULLY AND ADDED CONSIDERABLE CHARM TO THE APPEARANCE OF THE POST.

8. Willow.

There are a number of species, some of which grow to a large size, nor in commercial demand. They are used for fence posts and fuel. Little other use will likely be made of them.

9. Alder.

The alder does not grow to a large size, is confined to the banks of streams and does not occur in forest stands. Its chief value is for fuel.

The suitability of wood for pulp making purposes depends on the fineness, length and strength of the fibre, and less so on the colour and freedom from resin as the latter features may be rectified by chemical treatment.

The spruce, white or black, and the aspen poplar fulfill those conditions the best and are the most valuable for pulp, though all the others may be used and are used more or less for that purpose."

An interesting little pamphlet has been published by the Forestry Branch entitled "Forest Products of Canada," and may be had upon application to Mr. R. H. Campbell, Superintendent of Forestry.

A further memorandum from Mr. Campbell informs me that "the Honourable Charles E. Oak, Manager of the Miramichi Lumber Company., Chatham, New Brunswick, in a paper lately read before the Canadian Forestry Association Convention, held in Fredericton, N.B., February last, stated that to run one grinder producing 4 tons pulp, 300 h.p. were necessary."

OUR TRANSPORT PASSING THROUGH RED-TOP GRASS. RED-TOP GRASS MAKES THE FINEST OF HAY AND GROWS TO AN EXTRAORDINARY HEIGHT IN THE NORTH.

HAY.

The tract of country explored in the season of 1909 was particularly well supplied with hay. In the southeasterly portion, the Meadow Lake district, it is extremely plentiful and the quality of it is the very best. Several of the settlers living between Green Lake and Cold Lake have cattle and horses. Further north, around Whitefish Lake, there are very large hay meadows which are cut by the Indians with scythes and the hay put up in small stacks. Towards McMurray, although there is still ample hay, I did not see any stacks. South and north of Lac la Biche there is ample hay, in fact all that large strip of country between Lac la Biche and Clearwater River west of the 4th meridian is abundantly supplied with hay. At Cowpar Lake hay is easily obtainable and several head of cattle and horses are fed there.

RANCHING.

"I have, in my previous report, mentioned the fine ridge of country around the Big River. I passed through it again this year and had no reason to change my opinion of it as a cattle country.

At Meadow Lake there are two or three large herds of cattle which are thriving well. The grass at Meadow Lake grows perfectly, and is of the very finest quality for feed. The snow may be deep here, but hay is so easily procured that I am of the opinion that it would balance the scarcity of winter range.

Along the Pembina River there are fine hay meadows which should enable anybody who desires to keep cattle to procure ample feed for the winter.

To the west of Cowpar Lake there is a large prairie which would certainly afford magnificent summer range, though I am informed that in the winter the snow is too deep for cattle to range out. Northwest of Cowpar Lake I saw some horses grazing in December. Their owner had made no arrangement to winter them, and I am told that the horses thrived.

Close to Lac la Biche the country is more rolling and therefore, in my opinion, should afford an excellent winter range.

CATTLE ON THE MEADOW RIVER AT MR. EVANS' RANCH. THESE CATTLE TRAVELLED OVER THE ROAD FROM BATTLEFORD DURING THE WINTER BUT HAD COMPLETELY RECOVERED WHEN I SAW THEM THE BEGINNING OF AUGUST.

MIXED FARMING.

Mixed farming would appear to be the industry which most readily adapts itself to northern conditions.

Wheat can be grown in almost any part of the north which I have explored. It is undeniable that northern latitudes increase the likelihood of summer frosts. If, however, live stock is kept, the large yield of grain to the acre, even if slightly frosted, will pay quite as well converted into beef or pork as a smaller yield of the better quality grain in more southern latitudes.

At Meadow Lake the few settlers agree that two loads of hay will winter one animal, that is, two loads for each head of stock, whether yearling or full grown. Hay grows in such profusion that two loads to the animal could easily be obtained for even a large herd of cattle. There is little doubt that cattle fed and finished make better beef than range cattle, and the opportunity of procuring finishing food (ensilage) is always present in the northern latitudes.

I do not know if any statistics are available which would show the number of cattle at present produced in Southern Alberta and the numbers which were

duced when Alberta was a range country, but I feel sure the passing of the coyote has not lessened either the quantity or the quality of beef.

Pigs will, I firmly believe, thrive well in the north, and sheep will at any rate not suffer from the raids of the coyote.

Although the North may never seriously compete with the more southerly latitudes in the wheat market, still, by judicious mixed farming, it will eventually be equally productive and support a dense, thriving population.

ASCENDING THE RAPIDS ON THE WHITEFISH RIVER.

WATER POWER.

The Waterhen River is very rapid, and along it there are several small falls and steep descents. These would be ample to develop power for a small community but not enough for any commercial proposition.

On the Clearwater River occurs one of the best commercial water powers which I have seen. It could be easily and inexpensively developed.

Along the Athabaska River descending from Athabaska Landing to McMurray there are numerous falls. Mr. William Ogilvie, D.L.S., speaking of the Athabaska River, says: "The current averages well over four miles an hour, but the rate varies much with the height of water. Grand Rapids fall about 60 feet in a mile. They are a fine sight and will, when required, develop a lot of power. I would say in the average season fully as much as the Chaudiere Falls at Ottawa" or 80,000 h.p. From these rapids down to McMurray, a little over 80 miles, there are many rapids, but none of them appear to warrant the assurance of much power from them, although one or two might furnish a head of 6 or 8 feet.

ANIMAL LIFE.

Game of all kinds is to be found in this district. The principal species are moose, deer, caribou, elk, bear (black and cinnamon), lynx, wolf (timber), fox, lynx, wolverine, otter, beaver, mink, marten, muskrat, rabbit and squirrel.

The moose, of course, is the commonest of large animals. He is found almost over the tract and is, if anything, more plentiful than in former years, in spite of the fact that he is absolutely unprotected by game laws.

Caribou or the woodland species [illegible] are to be found here and there throughout the whole district.

Deer are not so common and are occasionally shot.

Elk or moose are believed to exist in good numbers. No signs noticed this year, owing to the long [illegible] great distance used.

The Lynx follows the rabbit and shares the latter's abundance, although not to such a great extent, as they were not very plentiful [illegible].

The wolf [illegible] during 1909 as to [illegible] upon the [illegible]. There do not appear to be many, still there are quite [illegible] to be [illegible] such

MR. STEELE, ONE OF THE PARTY, ON HORSEBACK THROUGH THE MEADOW LAKE COUNTRY. ONE CAN RIDE IN ANY DIRECTION. ALTHOUGH SWAMPS OCCUR, THEY ARE NOT DETRIMENTAL TO HORSE TRANSPORT.

destructive and detrimental to the rest of the game. A substantial bounty upon [illegible] very much needed.

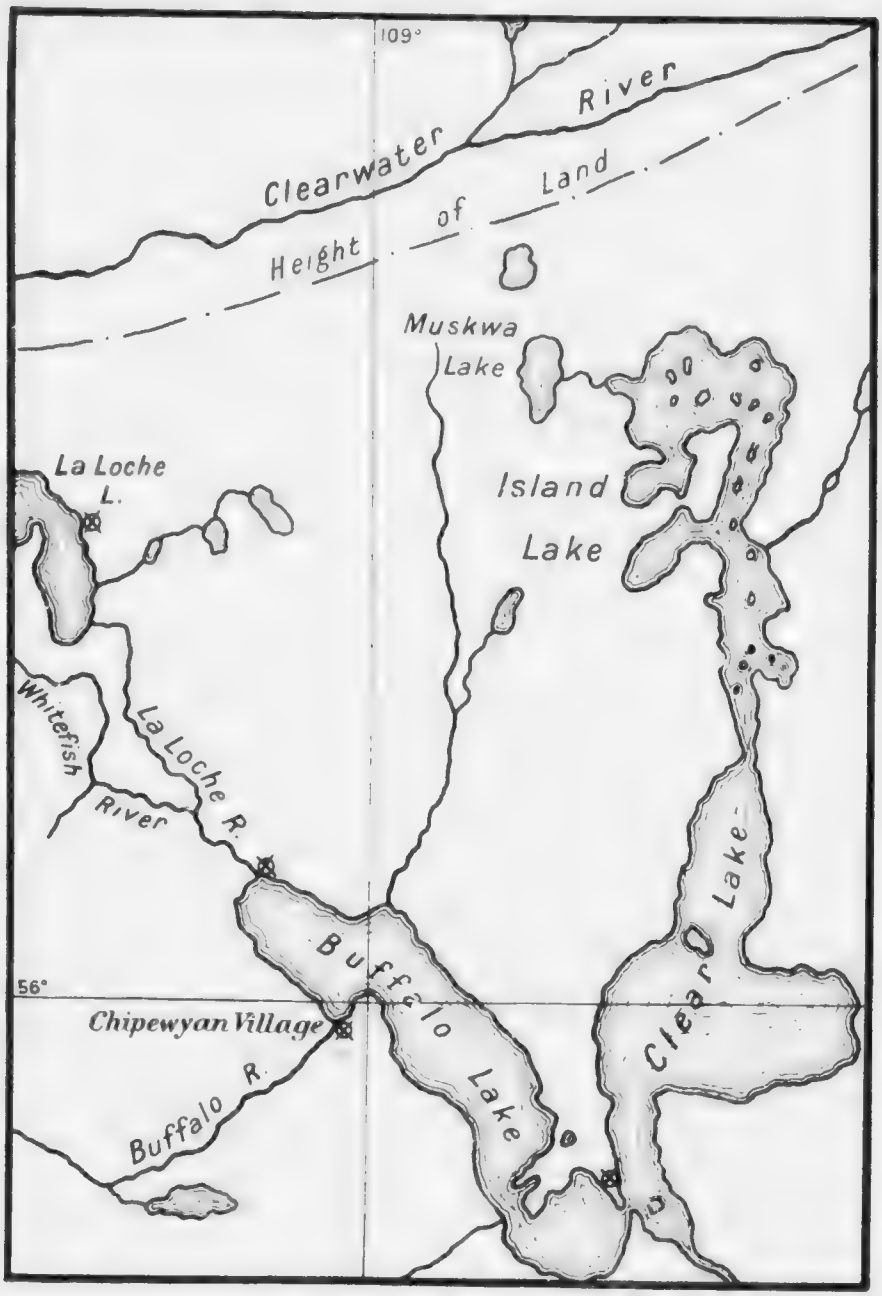
Fox are not plentiful, although some were taken.

Wolverines are scarce

Otters are very low

The Government of Ontario have passed a law against the [illegible] of beaver, I understand, this law has since been rescinded

Beaver are plentiful in the [illegible] districts, particularly [illegible] the Churchill [illegible] and the river [illegible] to the Churchill from the north. The [illegible] of [illegible] very easily followed and is unmistakable. [illegible] portions of the [illegible] the [illegible] It is natural to the Canadian [illegible] beaver. [illegible] recent years [illegible] a material [illegible] that the [illegible] [illegible] as a food to [illegible] I do not think [illegible] [illegible] Wisconsin [illegible] [illegible] Ontario deserves [illegible] to the [illegible] of beaver, although [illegible] [illegible] The [illegible] [illegible] [illegible]



ISLAND LAKE SECTION

whitefish. The whitefish in the Athabaska River are of a smaller size and poorer quality than those to be found in the headwaters of the Churchill. This may be due to the more constant fishery carried on in this section of the country. This season great numbers of fish were to be seen dead. I inquired from the natives and endeavoured to find a cause for this, but no one seemed to know anything about it, except that it was a periodical occurrence.

The perch, or as the natives sometimes call them, the doré, are found in most of the rivers and lakes. During the summer months they form the staple diet, as the whitefish apparently go into the deep holes in the lakes and are not caught by the natives, who rarely fish in deep water. From questioning the natives at Green Lake, as far as I can make out, there does not seem to be any appreciable difference in the number of fish caught now and twenty or thirty years ago. The natives seem to think that fish, like fur-bearing animals, have their good years and their lean years.

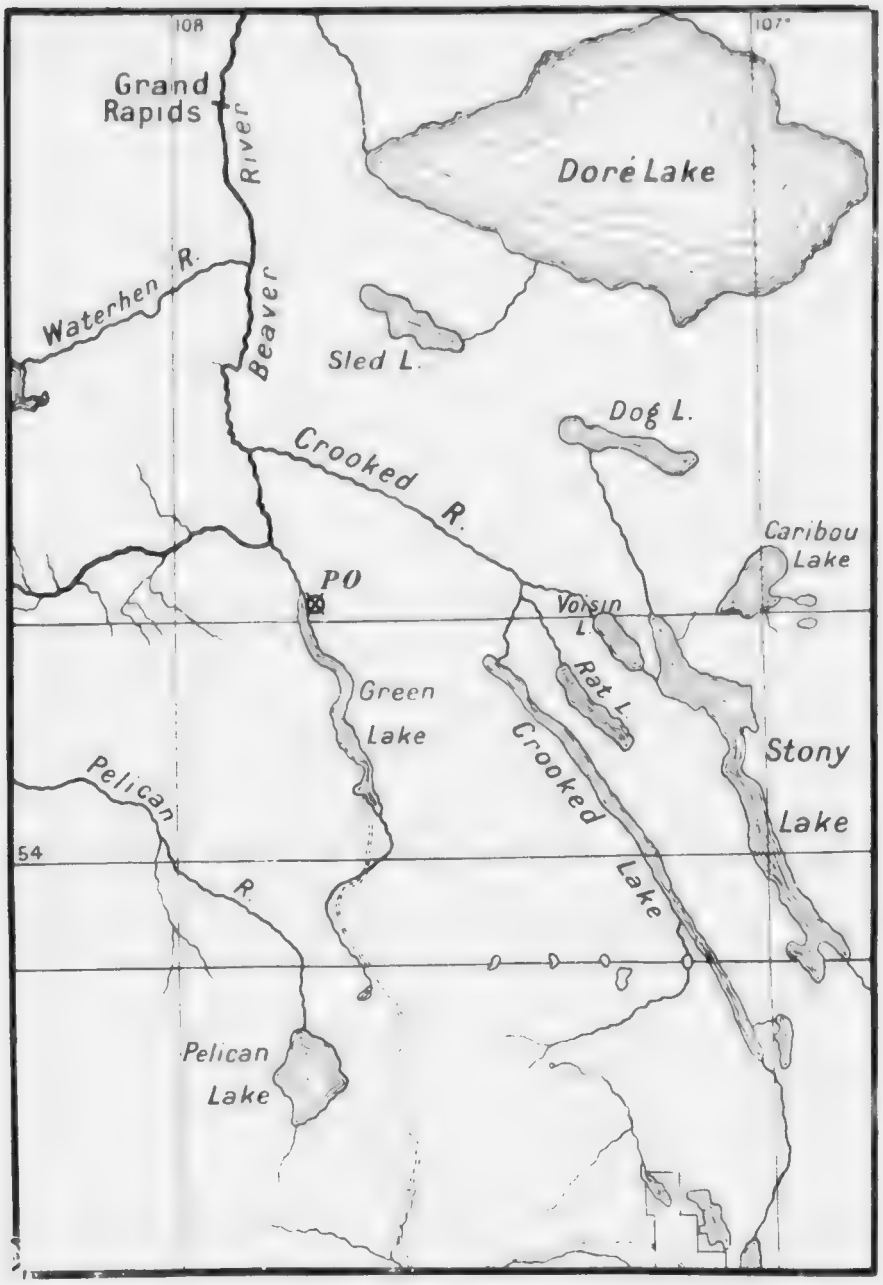
At La Loche Lake the fish are, undoubtedly, not of as good a quality as they were some years ago. The whitefish go down to Buffalo Lake, but only a small number apparently return. Bulls House, at the mouth of La Loche River, is where the fur traders and the natives procure their fall fish. Over 12,000 fish were "hung" there on November 1st, 1909.

Doré, or wall-eyed pike, are to be found in some lakes, although they are not at all numerous. The tullibee are to be found in many of the lakes, but not, however, in great numbers. This fish resembles the whitefish, and is very often mistaken for it, but close inspection will show that the flesh seems to be perforated by worms. It is generally considered unfit for food.

VIEW OF WATERHEN RIVER

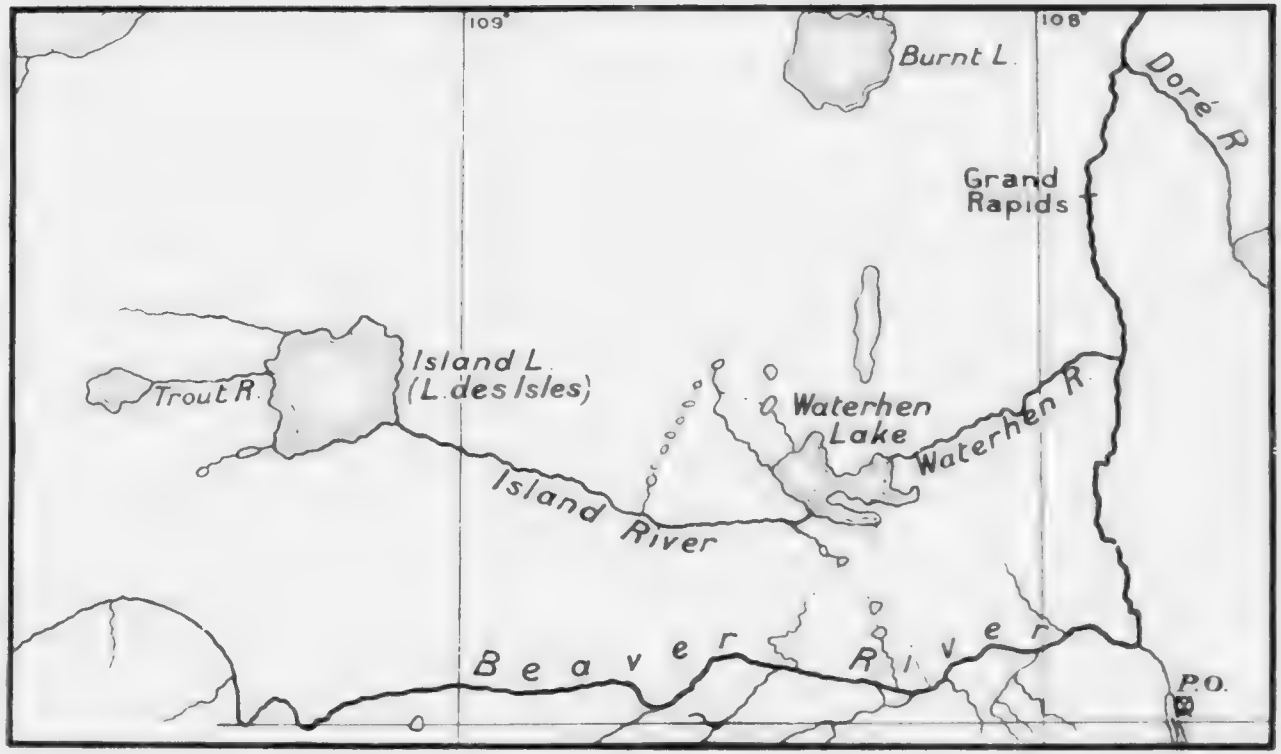
The worthless fish known as the loach, loche, methye or ling, is found in many of the northern waters. I have heard that this fish is edible, but personally, I should prefer not to try it, as I have endeavoured to feed it to my dogs with no success. Unless it is cooked, or the dogs starving, they will not touch it. This fish is said to injure the whitefish, and may be partly accountable for the scarcity of whitefish in La Loche Lake where the loach is to be found in great numbers, as the name of the lake would indicate.

I did not see any trout in any of the lakes through which I travelled, nor did I see any trout in any of the fish caches where the natives had stored their fall fish.



GREEN LAKE SECTION

I discovered that some [illegible] through last year [illegible] Lake. [illegible] through Cross Lake. I [illegible] [illegible] [illegible]



WATERHEN LAKE SECTION

A vast quantity of hay is cut at or around Green Lake. The spring being very late this year the crops were not very far advanced when I was there, but seemed did not promise such growth to any extent. There was a small field of oats, a small field of barley and the usual gardens. The garden is as customary in the by country, not neglected, but yet the vegetables seem to grow in profusion. Lettuce and radishes in fourteen days grow from the seed to a size fit for table use. On Sunday, July 19th, I saw some potatoes 12 inches in diameter, fourteen days' growth.

Mr. Beale rendered me valuable assistance in making a meander traverse of Green Lake.

WATERHEN LAKE SECTION

Waterhen Lake is a large body of water situated about twelve miles north of the Beaver River. On this lake there are some Indians living who do not belong to any treaty, and who are reported to still worship idols. It is also stated that they occasionally indulge in other pagan customs, although the truth of this cannot be proven. As far as I could ascertain, however, they have an idea that they own this part of the country, and that no white men have any rights in there.

The country surrounding Waterhen Lake is for the most part good, especially that portion which lies to the west of the lake, where there is some very fine land. Hay grows everywhere, and though the country can generally be considered wooded, there are large openings.

The land around Island River and Island Lake (Lac des Isles) is included in this tract.

From Island Lake to Beaver River there is a portage of 12 miles, which passes through the finest semi-open country. Peavine and vetch are found in abundance. This good land extends to the Fourth meridian, perhaps beyond; but I did not go any farther. No crops are grown. Indians there depend entirely on game, fish and fur for a somewhat precarious living.

POTATO FIELD ON SOUTH-EAST BAY OF LA LOCHE LAKE.

To the north of Waterhen Lake the country is swampy, large muskegs being found which almost preclude the possibility of travelling in summer, although in winter the trail is good.

The Indians informed me that the route from Waterhen Lake to Canoe Lake can be followed in almost a direct line north; but the portages are so bad that they

[illegible] it would take eight days' travelling. Northwest of Waterhen Lake the land rises somewhat, and a large ridge runs to Cedar Lake which, although timbered, does not contain very good soil, the country being more or less sandy. Along the foot of this ridge lies a wet muskeg, which is impassable. In this direction, that is, between the lake and Waterhen Lake, there is to be found a considerable stand of large spruce timber. The Indians try to keep the location of this timber more or less a secret as they wish to use it for canoe staves and paddles. Although I was unable to find out much concerning the existence of this timber, I located it without much difficulty. I had not time to accurately cruise the amount, but feel sure that there is a considerable quantity. There are several scattered clumps of fine spruce in this locality, which are passed on the string of small portages which I traversed from Waterhen Lake to Island River. The diameter would average perhaps 12", but running up to 24".

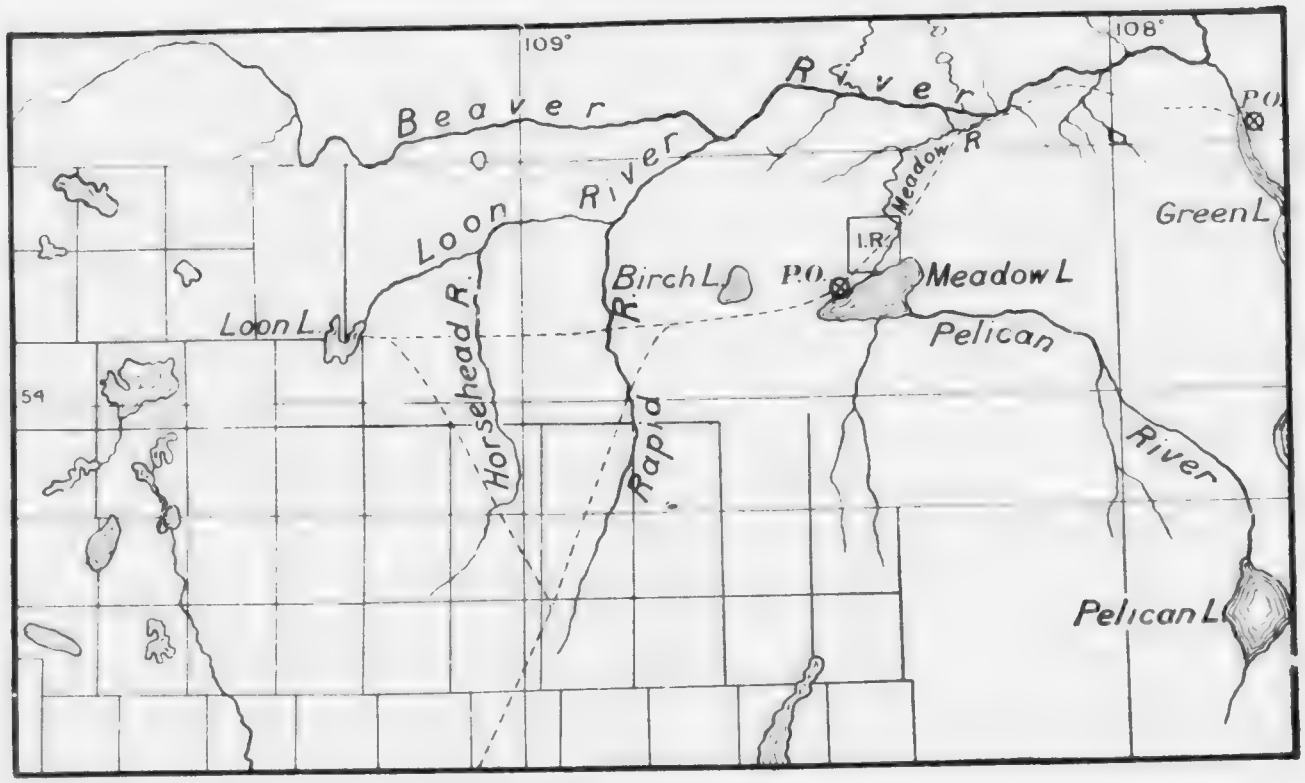
Waterhen River passes through a very large hay swamp shortly after flowing out of Waterhen Lake. As it approaches the Beaver River, however, the land becomes more of a muskeg, and although there are ridges containing arable land, the whole country may be taken to be sorely in need of drainage. I have no doubt this could be successfully carried out, as the Waterhen River is an extremely rapid one, containing numerous treacherous rapids and always a swift current. This river is famous in the district as a moose country.

Waterhen Lake is noted for its fine whitefish. When I was there in July, however, they were conspicuous by their absence. The Lake is rather shallow and consequently I guess the fish go up the Island River to Island Lake, or even further, to Cold Lake during the summer months.

[illegible] MEADOW LAKE [illegible] THIS IS AN EXCELLENT [illegible]

MEADOW LAKE SECTION

This section of the country [illegible] Meadow Lake [illegible] Island River [illegible] Island Lake



MEADOW LAKE SECTION.
Scale 12·5 miles to one inch

there was a plot of about five acres of the finest of banner oats. I could not obtain any data as to when these oats had been planted; but saw it on the 1st of August, when it looked very well with good promise of ripening in plenty of time before the frosts.

A settler named Evans is situated on the northern boundary of the Indian Reserve. In his garden I saw beans, tomatoes, peas, cauliflower, onions, carrots and parsnips, all doing very well. Mr. Evans came into this country last winter, at least just before the spring, broke this land, harrowing it as well as possible, and planted a garden on the sod on June 12th.

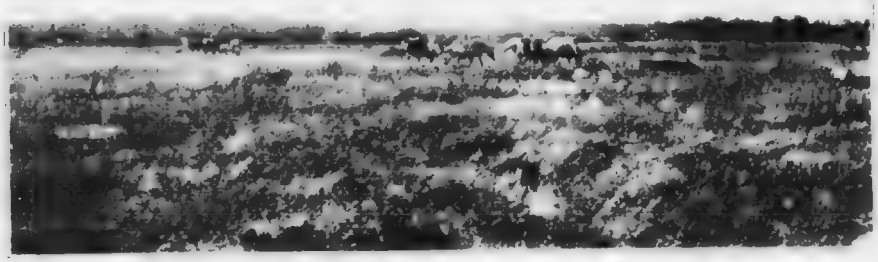
There was considerable disagreement amongst the people living in this country as to whether the grass really ripened. I satisfied myself later on (in October) that it really does ripen.

Evans, who has 35 head of cattle and 6 horses, estimates that two tons of hay will winter one animal. Hay here is by no means slough grass; but it is the fine of northern upland hay. Professor John Macoun speaks in the highest terms of the nutriment contained in this kind of hay. That there is ample of it is a certainty.

An old settler in this country is Cyprian Morin, who is a fine specimen of the old half-breed, or native. Born at Portage la Loche in 1834, he is now as active as a man of 30. Morin's mother died four years ago at the age of 109 years. She was at that time quite capable of doing a good deal of work; in fact, I am told, attended to all the baking. Morin who runs a trading post and has raised barley and garden vegetables every year for twenty years, has also 80 head of cattle and some 35 horses; he has never tried wheat. He says that the grass must ripen in this country, (and it does), as the horses remain fat all winter.

About eight miles to the west of Morin, a man named Fiddler has located, who has 150 head of cattle and 16 horses. Last winter his losses were extremely heavy. He told me that he lost 70 head of cattle; but said that it was because the cattle had not recovered from their travelling over the trail from Battleford.

William LaRonde who also lives in this locality, his place being situated on the Meadow Lake, has 50 head of cattle, all doing well.



TYPICAL VIEW OF THE COUNTRY AT MEADOW LAKE. AS WILL BE SEEN FROM THE PHOTOGRAPH, THE GROWTH OF GRASS AND PEA-VINE HERE IS EXTREMELY LUXURIANT. HORSES AND CATTLE THRIVE ON THIS RANGE. THE COUNTRY IS EVEN MORE OPEN THAN THE PHOTOGRAPH INDICATES, AS THE TIMBER SEEN IN THE BACKGROUND IS MERELY A SERIES OF SMALL POPLAR BLUFFS.

Rev. Father Cochin has lately opened a mission here, and has a rather nice little church, which is not yet finished. He has a good garden this year.

Fish are not found in Meadow Lake, with the exception of jackfish and perch, and even these are not numerous. Fur is very scarce in this country; but is said to be growing more plentiful. Game, particularly moose, is plentiful, and easily obtained. In winter the residents of this part of the country obtain their fish from Green Lake and Waterhen Lake.

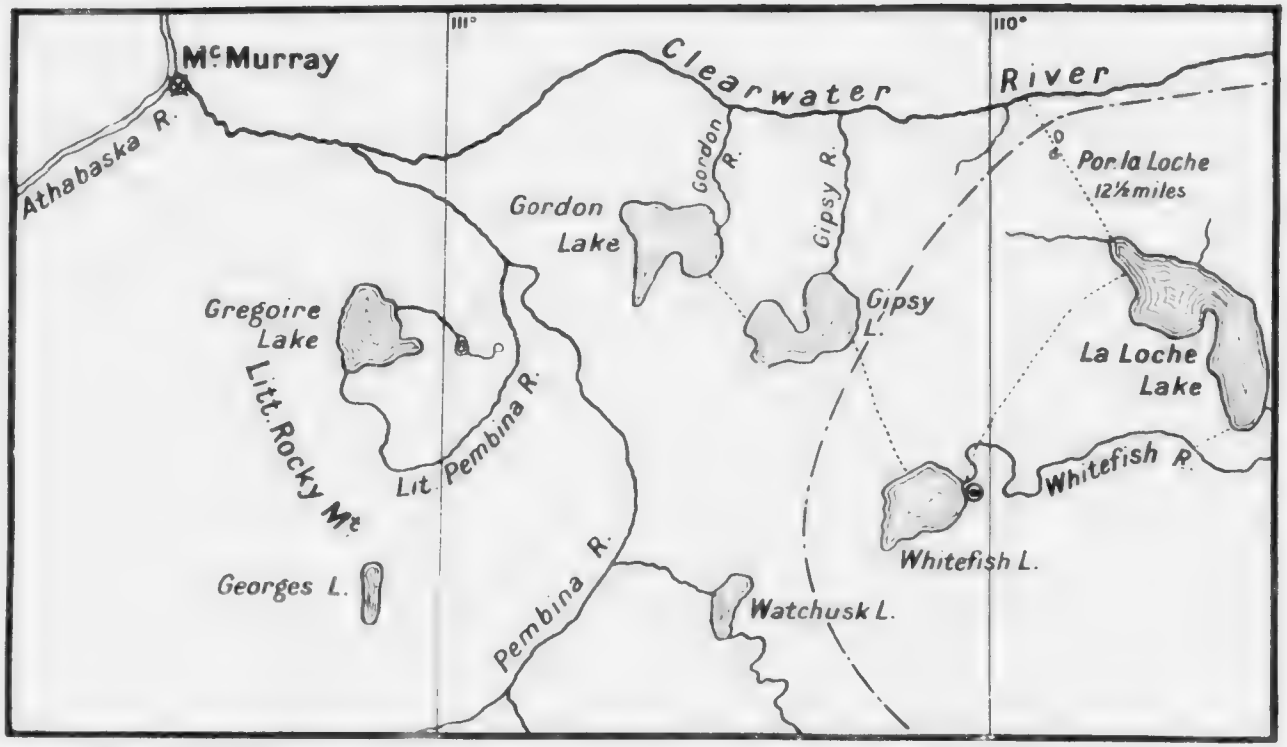
WHITEFISH LAKE SECTION.

This section lies almost upon the height of land between the Arctic Ocean and Hudson's Bay. The land is drier and of a better quality than that to be found at or around Buffalo Lake; still, as is often the case in this north country, one finds muskegs almost impassable either on top or very often half-way up a considerable hill. There are a great number of muskegs between Portage la Loche and Whitefish Lake, the country being flat and in need of draining. A pack trail used only in summer leads from the H. B. Company's post and Portage La Loche to the village at Whitefish Lake. The Whitefish River, which flows into the La Loche River about 7 miles above the confluence of the La Loche River and Buffalo Lake, is very little used as a waterway, being in fact almost impassable for canoes. I travelled this waterway with great difficulty. For miles and miles we walked in the river and dragged our canoes past many obstacles—shallow, rapids, rocks, snags, large boulders, in fact almost every obstruction that could exist in a river was found. Whitefish Lake is 240 feet higher than La Loche Lake, the portage which leads from it to Gypsy Lake (eight miles in length) crossing the actual height of land. From Gypsy Lake the water empties into the Clearwater, thence to the Athabaska and Arctic Ocean. The natives at Whitefish Lake grow turnips, carrots, parsnips and potatoes; but lack seed of any other kind. The potatoes are completely worn out and change of seed is certainly necessary.

Going southwest from Whitefish Lake towards the Pembina River, the land improves, some very fine semi-open country being encountered.

A POTATO FIELD ON THE ROAD TO WHITEFISH LAKE.

The Indians at Whitefish Lake, who travel a great deal, use horses rather than canoes. The horses which I saw were not noticeable either for their condition or their breeding, the former being extremely poor, and the latter being absent—Indian cayuses of the common type.



WHITEFISH LAKE AND CLEARWATER VALLEY SECTIONS.

Scale 12 miles = 1 inch

Along the Whitefish River there is a considerable quantity of good tamarac; but although this timber would be extremely useful to any settler coming into the country, I do not think there is sufficient for any commercial project.

CLEARWATER VALLEY SECTION.

The Clearwater River winds through a valley which has received very favourable notice from many travellers and explorers; and which favourable notice is, in my opinion, amply deserved. Sir Alexander Mackenzie, in his "Voyage from Montreal through the continent of North America to the Frozen and Pacific Oceans in 1789 and 1793," speaks of the elk and buffalo which pastured in this valley. I do not think the valley has changed to any extent since his time, except that the buffalo, and possibly the elk, are no longer to be found.

VIEW OF THE BEAUTIFUL VALLEY OF THE CLEARWATER RIVER.

After one has travelled from the East through the flat and comparatively uninteresting country before one reaches the height of land, to stand upon the height of land and gaze upon the fair field nestling, as it were, at one's feet, is indeed a relief. I can easily understand how Sir John Richardson came to speak of it as one of the prettiest spots in Canada. The height of land along this valley is close to the river, and from almost any position thereon one can obtain a magnificent view. No picture taken with any camera could, to my thinking, do justice to the scenery, and yet it is not that scenery which pleases the artistic sense alone, for here one finds peavine, vetch, red-top and upland hay growing in profusion. Here and there groves of large spruce relieve the monotony of meadow land and afford to the settler a promise of building timber and shelter for his cattle. At frequent intervals small creeks bring their tribute of clear spring water. I touched this height of land further upon the Clearwater than the famous portage, and in my opinion the view obtained was far and away better than that obtained from the Portage. It is possible that I did not properly appreciate the artistic sense of this view, but one cannot help but be convinced that to this valley nature has been extremely bountiful.

CLEARWATER VALLEY.

The Clearwater River is a stream varying from 100 feet to 300 feet wide. It is fairly rapid, and generally about 4 feet deep. At several points along the river there is a considerable fall where a substantial amount of power might be developed.

The valley is from half a mile to 3 miles wide, and generally contains magnificent soil. In the upper region the timber is large and almost completely covers the valley. On the slopes of the valley, which are from 200 to 600 feet long and rather steep, the timber still continues poplar and some spruce, but once the bench land is reached there are some large openings, and hay meadows to be found.

The country to the north of the Clearwater has not been explored even by fur-traders or Indians. Occasionally one meets a half-breed who has travelled partly through it, and the rumour current amongst the fur-traders is that the country contains nothing but small lakes, jackpine and rock outcrop. Still, the Indians who trap in this country kill nothing but beaver, which it is well known live upon poplar, therefore I concluded the country must be a poplar country and of some promise agriculturally.

MISS CHRISTINA GORDON AND HER WHEAT FIELD AT McMURRAY.

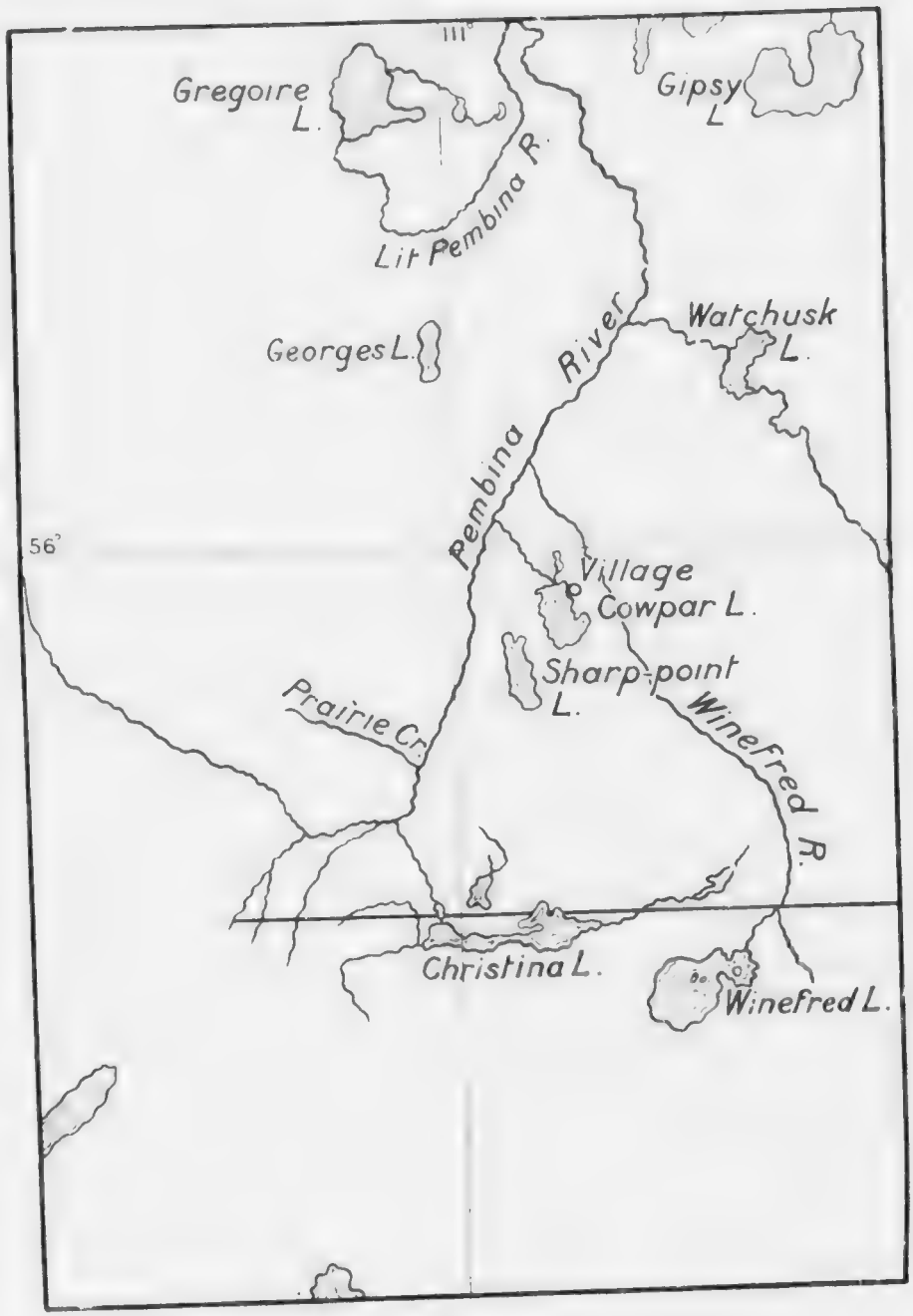
When the railway reaches McMurray, there is no doubt that a large agricultural settlement will take possession of this beautiful valley.

COWPAR LAKE.

Cowpar Lake, as shown on the map, lies just south of latitude 56°. It is a small, almost round lake, and of itself of no great importance. Whitefish are caught there, but not in large numbers. The surrounding country, however, is exceptionally good farming land, and to the east and south at about 10 miles distance is found the commencement of a large prairie about 40 miles long and varying from 12 to 15 miles in width. This prairie is in its present state fitted for agriculture. The Indians from Cowpar Lake go there in the spring and plant gardens, leaving them until the fall when they bring the produce to their homes at Cowpar Lake.

The Pembina River flows through the south end of this prairie, and several small lakes touch it. The prairie is watered by small creeks draining into these lakes, and altogether it is an ideal spot for the pioneer, as hay, water, wood and fish are to be found in abundance throughout its extent.

The land adjoining Cowpar Lake on the east and south is all arable, being open and rolling. To the northeast, towards Whitefish Lake, the land is also good.



COWPAR LAKE AND WINEFRED LAKE SECTIONS

Scale 12·5 miles to one inch

There is a fairly large body of good merchantable timber to the west and north. It seems to probable that Cowper Lake will some day be a centre of a considerable settlement, although at present the only occupants are about four families of Chipewyans.

WINTERED LAKE

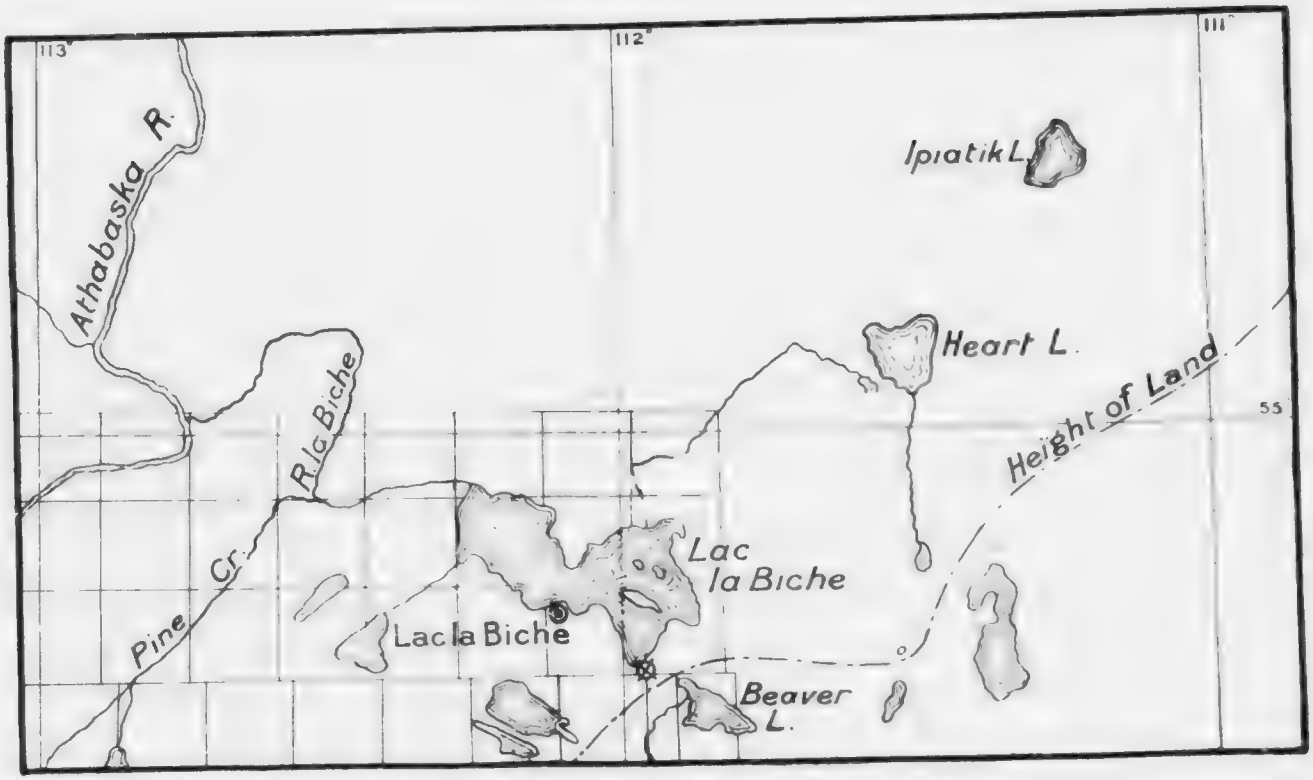
This is a large body of water amply stocked with fine whitefish. Houses are to be noticed at intervals of a mile or half a mile apart all along the southeast shore, but I could not say what the exact population would be. These houses, I

SOME METHODS OF TRANSPORTATION

know, are not all occupied. Fur Indians both from the south and north come to Wintered Lake to catch fish in the fall. The country surrounding the lake is mostly swampy hay land but might, I fancy, be easily drained. A good deal of muskeg is found in this vicinity, indeed, more than anywhere else that I travelled for on the west shore of the Athabaska.

HEART LAKE

Heart Lake is situated so close to Lac La Biche that one might almost be taken to be in surveyed country. The land is all good here, though somewhat



HEART LAKE SECTION.

Scale 12 miles to one inch

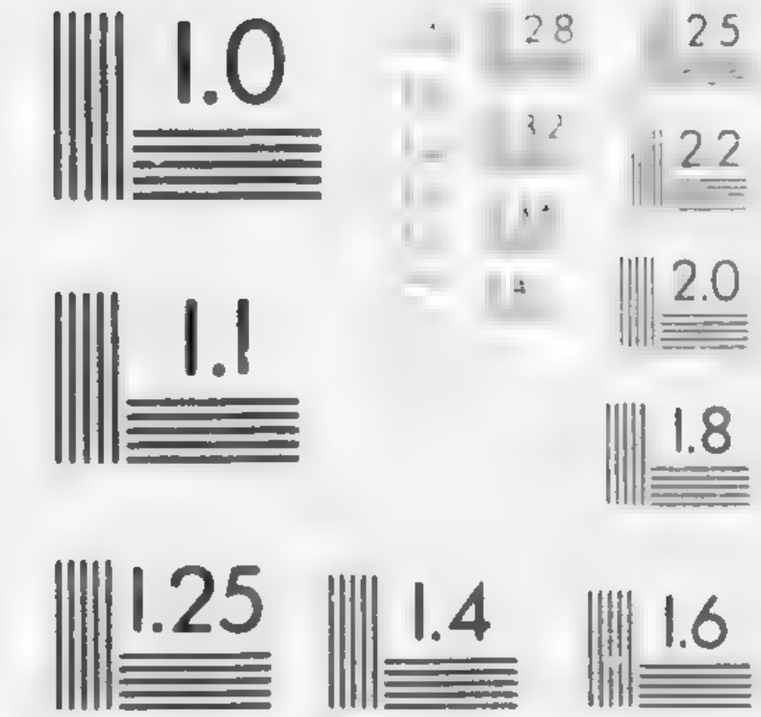
nothing and reached to be booked. There is no reason on record to turning around this lake than there is anywhere else between it and Edmonton. The country is identical with that passed through en route to Edmonton. There is said to be considerable timber near Henry Lake, but I could not see it. In fact the country is almost prairie, with small clumps of poplar being the only protection or wood.

FRANK J. P. CREAN, C.E.

HOME AT LAST

APPENDIX

MICROCOPY RESOLUTION TEST CHART



COAL MINING REGULATIONS

Regulations for the disposal of coal mining rights, which are the property of the Crown in the Provinces of Manitoba, Saskatchewan and Alberta, the Yukon Territory, the North West Territories, the Railway Belt in the Province of British Columbia, and within the tract containing three and one-half (3½) million acres acquired by the Dominion Government from the Province of British Columbia, and referred to in Sub-section (b) of Section 3 of the Dominion Lands Act, approved by Order in Council dated the 20th day of April, 1910

'Minister' shall mean the Minister of the Interior.

'Surveyed land' for the purposes of these regulations, shall mean a section or a part of a section one of the boundaries of which has been defined by a surveyed line, and one of the corners of which has been marked on the ground by a survey post or mound, and the official plan of which, showing such survey and marking, has been approved by the Surveyor General.

'Coal mining locations' shall mean a tract of land, containing coal, located or staked in accordance with these regulations.

'Locator' shall mean the person who locates or stakes a coal mining location, in the manner prescribed in these regulations

'Year' shall mean a period of twelve consecutive calendar months.

1. The coal mining rights, which are the property of the Crown in the provinces of Manitoba, Saskatchewan and Alberta, the Yukon Territory, the Northwest Territories, the Railway Belt in the province of British Columbia, and within the tract containing three and one-half million acres of land acquired by the Dominion Government from the province of British Columbia, and referred to in sub-section (*b*) of Section 3, of the Dominion Lands Act, may be leased by the Minister at an annual rental of $1 per acre, payable yearly in advance.

Provided, however, that these regulations shall not apply to school lands or to any land comprised within the Rocky Mountains Park of Canada, or within Dominion Forest Reserves, or to land within the Jasper Forest Park of Canada, or other reserves made by Parliament, or by order of the Governor-in-Council, or to land within any incorporated city, town or village, unless otherwise specially provided by the Governor-in-Council

The term of the lease shall be twenty-one years, renewable for a further term of twenty-one years, provided the lessee furnishes evidence satisfactory to the Minister, to show that during the term of the lease he has complied fully with the conditions of such lease, and with the provisions of the regulations regarding the disposal and operation of coal mining rights which may have been made from time to time by the Governor-in-Council.

2. The maximum area of a coal mining location shall be 2,560 acres, and no person shall be allowed to hold more than one location.

Provided that a person who has been granted a lease for a location, and who subsequently abandons or assigns the same, may, after the expiration of twelve months from the date of the said lease, be permitted to secure another location:

Provided further, however, that such right of relocation shall not be granted unless all payments on account of rent, royalty, or other liability to the Department, due by such person, have been fully made, up to the date of the registration by the Department of the assignment of his right to such lease, or up to the date upon which the notice of his abandonment of the same was received by the Department.

3. The location applied for, if it comprises surveyed land, shall consist of sections or legal subdivisions of sections, but the several parcels comprising the location must adjoin, and the whole area applied for shall not exceed four miles in its greatest dimension, nor shall the length exceed four times the breadth.

4. Application for a coal mining location, comprising surveyed land, shall be filed by the locator in person with the Agent of Dominion Lands for the district in which the location is situated, or with a Sub-Agent for such district for transmission to the Agent, but priority of application shall be based upon the date of the receipt of such application in the office of the Agent of Dominion Lands for the district, which shall be the office of record for all applications for coal mining locations. The application shall contain a full description by section, part of section, township and range, of the land applied for.

5. Application for a coal mining location, situated in unsurveyed territory, shall be filed by the locator in person with the Agent of Dominion Lands for the district in which the location is situated, or with a Sub-Agent for such district for transmission to the Agent, within thirty days from the date upon which the location applied for was staked in accordance with Section (6) of these regulations. If, however, the location is distant more than one hundred miles from the office of the Agent, or Sub-Agent, the locator shall be allowed one additional day for each ten miles, or fraction thereof, in excess of one hundred miles. If the application is not filed within the time prescribed, it shall not be considered.

6. Application for a location situated in unsurveyed territory shall contain a description by metes and bounds of the location applied for, and shall be accompanied by a plan showing the position of such location in its relation to some prominent topographical feature or other known point. The plan shall contain sufficient data to admit of the position of the location applied for being definitely shown in the records of the Department. The location must be rectangular in form, except where a boundary of a previously located tract is adopted as common to both locations, the length not to exceed four times the breadth.

The application shall be accompanied by evidence, supported by affidavit of the locator, to show that the following requirements have been fully complied with.

(a) That the location applied for has been defined on the ground by the locator in person by planting two wooden posts, at least four inches square, and standing not less than four feet above the ground, such posts being numbered '1' and '2' respectively. The distance between post No. '1' and post No. '2' shall not exceed 21,120 feet, and upon each post shall be inscribed the name of the locator and the date of the location. Upon post No. '1' there shall be written in addition to the foregoing, the words 'initial post,' the approximate compass bearing of post No. '2', and a statement of the number of feet lying to the right and to the left of the line between post No. '1' and post No. '2.' Thus—(Initial post, direction of post No. '2' is ..... feet lie to the right and ..... feet to the left of the line between post No. '1' and post No. '2.'

When the tract which an applicant desires to lease has been located, he shall immediately mark the line between post No. '1' and post No. '2,' so that it can be distinctly seen, in a timbered locality, by blazing trees and cutting underbrush, and in a locality where there is neither timber nor underbrush he shall set posts of the above dimensions or erect mounds of earth or rock not less than two feet high and two feet in diameter at the base in such a manner that the line may be distinctly seen.

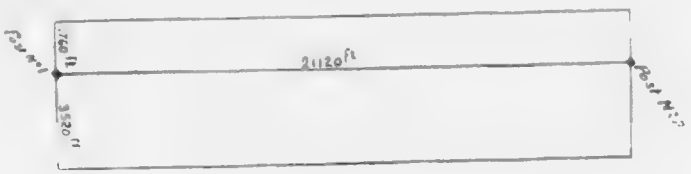
(b) All the particulars required to be inscribed on posts No. '1' and No. '2,' shall be set out in the application and shall be accompanied by a plan

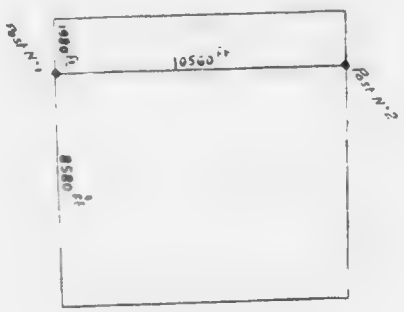
showing the position of the tract in its relation to some prominent topographical feature or other known point, such plan to contain sufficient data to admit of the location being shown definitely on the record of the Department.

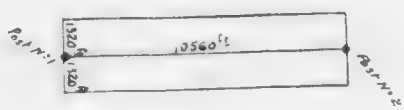
(*c*) The locator shall post a written or printed notice on a conspicuous part of the location applied for, setting out his intention to apply within thirty days from the date of such notice for a lease of the coal mining rights under the said location.

(*d*) The application shall be accompanied by evidence, supported by the affidavit of the locator, in due form, to show that the above requirements of the regulations have been fully complied with.

(For purposes of illustration, the following diagrams are given to show the manner in which coal mining locations may be laid out in unsurveyed territory.)







7. Where two or more persons lay claim to the same location, or to portions of the same locations, the right to acquire a lease shall be in him who can prove to the satisfaction of the Minister that he was the first to take possession of the tract in dispute by demarcation in the manner prescribed in these regulations, and that he made application for a lease thereof within the specified time.

8. As soon as the survey of a township has been confirmed all coal mining leaseholds embracing any portion of such township so surveyed and confirmed shall,

if the Minister so directs, or in order to conform to the Dominion Lands system of survey by the substitution of a new lease describing by sections, legal subdivisions of sections or regular portions of legal subdivision, as nearly as may be, the tract embraced in the leasehold insofar as the township so surveyed is concerned.

The balance of the leasehold, which may still be in unsurveyed territory, shall continue to be described as in the lease originally issued, until such portion is included in a confirmed survey.

9. As soon as the survey of a township has been confirmed, all coal mining leasehold embracing any portion of the township so surveyed and confirmed, shall be subject to the withdrawal forthwith from the lease, without compensation to the lessees, of any portions which, in accordance with such confirmed survey, are found to be the property of the Hudson's Bay Company.

Provided, however, that upon such withdrawal being made from any location in good standing, the rental paid on the land so withdrawn, in whole or in part, may, in the discretion of the Minister, be refunded to the lessee.

10. The lessee shall commence active operations on his leasehold within one year from the date upon which he may be notified by the proper officer of the Department of the Interior to do so, and shall produce from such operations the quantity of coal specified in the said notification. Such notification shall not be given until the expiration of at least one year from the date of the lease, and shall set out the quantity of coal which the lessee is required to mine and produce at the pit's mouth ready for shipment, which quantity, however, may be increased from time to time, upon thirty days' notice to that effect being given to the lessee, but in no case shall the maximum quantity required to be mined exceed ten tons per annum for each acre leased. In case operations are not commenced within the time specified in the notice, or if the required quantity of coal is not mined during each year, the lease shall be subject to cancellation in the discretion of the Minister.

11. The lessee shall not assign, transfer or sublet the rights described in his lease or any part thereof, without the consent in writing of the Minister being first had and obtained.

12. The boundaries beneath the surface of coal mining locations shall be the vertical planes or lines in which their surface boundaries lie.

13. All leases of coal mining rights issued under these regulations shall be subject to the provision that actual settlers shall be entitled to buy at the pit's mouth whatever coal they may require for their own use, but not for barter or sale, at a price not to exceed $1.75 per ton, and the lease issued for coal rights shall be made subject to such provision.

14. The lease shall be in such form as may be determined by the Minister of the Interior, in accordance with the provisions of these regulations.

15. A fee of $5 shall accompany each application for a lease, which will be refunded if the rights applied for are not available, but not otherwise.

16. If the application is granted, the locator shall be notified in writing, and he shall be given a period of thirty days from the date of the receipt of his application within which to pay to the Agent of Dominion Lands the full amount of the rental for the first year of the term of the lease, at the rate of one dollar ($1) per acre, and upon the receipt of such rental the lease shall be issued and shall bear date from the day upon which the application was signed. If the rental is not paid within the time specified, the application shall absolutely lapse, and the rights applied for shall become available for other disposition.

17. If during the term of the lease the lessee shall fail to pay the rental in advance for each subsequent year at the rate of one dollar ($1) an acre per annum, within thirty days after the date upon which the same became due, the lease shall be subject to cancellation in the discretion of the Minister and to the immediate forfeiture of all the rights granted thereunder.

18. If the location is situated in surveyed territory, and the surface rights thereof have been patented or have been disposed of by the Crown under any Act or regulation which contemplates the issue of patent, or if the surface rights have been disposed of temporarily under a terminable grant, the Minister may, in consideration of the expenditure to be incurred by the locator on the tract leased, in prospecting operations, and upon application to that effect, in the proper form, being filed with the Agent, or Sub-Agent of the district in which the location is situated, waive the payment of the rental for the first and second years of the term of the lease, subject to the following conditions:

(*a*) Each such application shall be accompanied by a fee of one hundred dollars ($100), which amount will be deducted form the expenditure which the locator shall be required to incur in prospecting operations on his leasehold during the first year of the term of his lease. Such fee shall be refunded to the locator if the application is not granted.

(*b*) Subject to the deduction of the one hundred dollar fee, as provided in the foregoing subsection (*a*), the locator shall expend in actual prospecting operations upon his leasehold, by recognized methods, during each of the first and second years of the term of his lease, the sum of not less than one dollar ($1) for each acre of the total area of his location, and shall, prior to the termination of each of the said two years, submit evidence, satisfactory to the Agent, supported by affidavit, to show that he has incurred the required expenditure in actual prospecting operations, by recognized methods, on the tract covered by his location. If the lessee fails to submit such evidence in the manner prescribed, the lease shall be subject to cancellation in the discretion of the Minister and to the immediate forfeiture of all the rights granted thereunder.

19. In addition to the rent, a royalty at the rate of five cents per ton of two thousand pounds, shall be levied and collected on the merchantable output of the mine, and such royalty shall be payable monthly to the Agent from the date upon which operations may be commenced. The person operating a mine shall furnish the Agent of Dominion Lands with sworn returns monthly, or at such times as the Minister of the Interior may direct, accounting for the full quantity of merchantable coal mined.

20. Every lessee of coal mining rights which are not being operated shall furnish the Agent of Dominion Lands with a sworn statement to that effect at least once in each year.

21. Default in payment of the royalty, or in furnishing the returns, if continued for thirty days after notice has been posted at the mine, or conspicuously on the property in respect of which it is demanded by the Agent of Dominion Lands, or by his direction, may be followed by cancellation of the lease, or the imposition of a fine in the discretion of the Minister of the Interior.

22. Any attempt to defraud the Crown by withholding any part of the revenue thus provided for, by making false statements of the amount taken out, may, in the discretion of the Minister, be punished by fine, or by the cancellation of the lease in respect of which fraud or false statement has been committed or made. In respect to the facts as to such fraud or false statements, or non-payment of royalty or failure to furnish returns, the decision of the Minister of the Interior shall be final.

23. An Agent of Dominion Lands or any other officer or person so designated by the Minister shall have the right to enter upon any land comprised within a coal mining location, or the workings therein, to examine all records and books of account of the lessee or operator of such mining location, and to make such other examination as may be deemed necessary in order to ascertain whether or not the terms of the lease for such location are being duly complied with.

24. The lease shall include the coal mining rights only, but the lessee may, upon application, be permitted to purchase at the rate of $10 an acre whatever area of the available surface rights thereof the Minister may consider necessary for the efficient and economical working of the coal mining rights granted under such lease.

25. In case the surface rights of a coal mining location are covered by a timber license, grazing, or petroleum lease, mining claim or other form of terminable grant which does not contemplate the issue of patent, the lease shall not authorize entry thereon, except the permission of the Minister is first had and obtained, and such permission shall be given subject to such conditions for the protection of the rights of such lessee or licensee as it may be considered necessary to impose.

26. In case the surface rights of a coal mining location have been patented, or have been disposed of by the Crown under any Act or regulation which contemplates the earning of patent for such surface rights, and the lessee of the coal mining rights cannot make an arrangement with the owner of the surface rights, or his agent, or the occupant thereof, for entry upon the location, or for the acquisition of such portion of the surface rights as may be necessary for the efficient and economical operation of the rights acquired under his lease, he may, provided the mineral rights in the land affected with access thereto and the right to use and occupy such portion of the said land as may be necessary for the effectual working of the minerals therein have been reserved to the Crown in the original grant of the surface rights, apply to the Minister for permission to submit the matter in dispute to arbitration. Upon receiving such permission in writing it shall be lawful for the lessee to give notice to the owner, or his agent, or the occupant, to appoint an arbitrator within a period of sixty days from the date of such notice, to act with another arbitrator named by the lessee, in order to determine what portion of the surface rights the lessee may reasonably acquire:

(*a*) For the efficient and economical operation of the rights and privileges granted him under his lease.

(*b*) The exact position thereof, and,

(*c*) The amount of compensation to which the owner or occupant shall be entitled.

The notice mentioned in this section shall be according to a form to be obtained upon application to the Agent of Dominion Lands for the district in which the land in question is situated, and shall, when practicable, be personally served on the owner of such land, or his agent, if known, or the occupant thereof, and after reasonable efforts have been made to effect personal service without success, then such notice shall be served, by leaving it at, or sending it by registered mail, to the last known place of abode of the owner, agent, or occupant, and by posting a copy of the same in the office of the Agent of Dominion Lands for the district in which the land in question is situated. Such notice shall be served if the owner, or his agent, resides in the district, in which the land is situated, ten days; if out of the district and if in the province or territory, twenty days, and if out of the province or territory, thirty days, before the expiration of the time limited in such notice. If the owner, or his agent, or the occupant of the land, refuses or declines to appoint an arbitrator, or when, for any reason, no arbitrator is so appointed in

the time limited therefor in the notice provided for by this section, the Agent of Dominion Lands for the district in which the land in question is situated shall forthwith, on being satisfied by affidavit that such notice has come to the knowledge of such owner, agent, or occupant, or that such owner, agent, or occupant, wilfully evades the service of such notice, or cannot be found, and that reasonable efforts have been made to effect such service, and that the notice was left at the last place of abode of such owner, agent, or occupant, as above provided, appoint an arbitrator on his behalf.

27. In case the two arbitrators cannot agree upon the award to be made, they may, within a period of ten days from the date of the appointment of the second arbitrator select a third arbitrator, and when such two arbitrators cannot agree upon a third arbitrator, the Agent of Dominion Lands for the district in which the land in question is situated, shall forthwith select such third arbitrator.

28. All the arbitrators appointed under the authority of these regulations shall be sworn before a justice of the peace to the impartial discharge of the duties assigned to them, and after due consideration of the rights of the owner and the needs of the lessee, they shall decide as to the particular portion of the surface rights which the latter may reasonably acquire for the efficient and economical operation of the rights and privileges granted him under his lease, the area thereof, and the amount of compensation therefor to which the owner or occupant shall be entitled.

29. In making such valuation the arbitrators shall determine the value of the land irrespective of any enhancement thereof from the existence of minerals thereunder.

30. The award of any two such arbitrators made in writing shall be final, and shall be filed with the Agent of Dominion Lands for the district in which the land is situated, within twenty days from the date of the appointment of the last arbitrator. Upon the order of the Minister the award of the arbitrators shall immediately be carried into effect.

31. The arbitrators shall be entitled to be paid a per diem allowance of $5, together with their necessary travelling and living expenses, while engaged in the arbitration, and the costs of such arbitration shall be borne by the lessee.

These regulations shall come into force on the 25th day of May, 1910.

PETROLEUM REGULATIONS

Regulations for the disposal of Petroleum and Natural Gas rights, the property of the Crown, in Manitoba, Saskatchewan, Alberta, the Northwest Territories, the Yukon Territory, and within the tract containing three and one-half (3½) million acres of land acquired by the Dominion Government from the Province of British Columbia and referred to in subsection (b) of section 3 of the Dominion Lands Act, approved by Order in Council dated the fifteenth of March, 1910

'Minister' shall mean the Minister of the Interior or Deputy

1. The petroleum and natural gas rights, which are the property of the Crown, in Manitoba, Saskatchewan, Alberta, the Northwest Territories, the Yukon Territory, and within the tract containing three and one-half (3½) million acres of land acquired by the Dominion Government from the Province of British Columbia, and referred to in subsection (*b*) of section 3 of the Dominion Lands Act, may be leased to applicants at a rental of twenty-five (25) cents an acre for the first year and for each subsequent year a rental at the rate of fifty (50) cents an acre, payable yearly in advance. The term of the lease shall be twenty-one years, renewable for a further term of twenty-one years, provided the lessee can furnish evidence satisfactory to the Minister to show that during the term of the lease he has complied fully with the conditions of such lease and with the provisions of the regulations in force from time to time during the currency of the lease.

2. No applicant shall be allowed to lease the petroleum and natural gas rights under an area of more than 1,920 acres.

3. If the tract applied for is situated in surveyed territory, it shall consist of sections, or legal subdivisions of sections, but the several parcels comprising the tract shall be adjoining, the length of the tract not to exceed three times its breadth. In unsurveyed territory, if at least one of the lines bounding the section or part of section applied for has been surveyed, and such survey has been duly approved, an application for a lease of the petroleum and natural gas rights under such section or part of section may be considered under the provisions of this section of the regulations.

4. Application for a lease of the petroleum and natural gas rights on surveyed lands shall be filed by the applicant in person with the Agent of Dominion Lands for the district in which the rights applied for are situated, or with a sub-agent for such district, for transmission to the agent, but priority of application shall be based upon the date of the receipt of such application in the office of the Agent of Dominion Lands for the district.

5. In case the surface rights of the tract applied for have been patented, or have been disposed of by the Crown under any Act or Regulation which contemplates the earning of patent for such surface rights, the lease shall not authorize entry thereon except with the written consent of the owner or occupant being first had and obtained. In the case of a timber license, grazing or coal mining lease, mining claim, or other form of terminable grant which does not contemplate the issue of patent, the permission of the Minister to enter upon the land must first be obtained, which permission will be made subject to such conditions for the protection of the rights of such lessee or licencee as it may be considered necessary to impose.

6. If the tract applied for is situated in unsurveyed territory, application for a lease shall be made by the applicant in person to the Agent of Dominion Lands for the district in which the tract applied for is situated, or to a sub-agent for such district, for transmission to the Agent.

7. The application shall contain a description by metes and bounds of the tract applied for, and shall be accompanied by a plan showing the position of such tract with its relation to some prominent topographical feature or other known point. The plan shall contain sufficient data to show the position of the tract applied for being definitely shown in the records of the Department. Such tract must be rectangular in form, except where a boundary of a previously located tract is adopted as common to both locations, the length not to exceed three times the breadth.

The application shall be accompanied by evidence supported by affidavit to show that the following requirements have been fully complied with by the applicant in person, and not through another:—

(a) That the tract applied for has been duly defined on the ground by planting a wooden post at least four inches square, and standing not less than four feet above the ground, at one angle or corner of the said tract.

(b) Upon such post shall be inscribed the name of the applicant, the date of the location, the angle represented by the post, the length and direction of the boundaries of the tract applied for. Thus: "A. B.'s petroleum location N.E. corner" (meaning the northeast corner), this claim extends three miles west and one mile south from this post, or as the case may be.

(c) That a written or printed notice has been posted on a conspicuous part of the tract applied for, setting out the intention of the applicant to apply within thirty days from the date of such notice, for a lease of the petroleum and natural gas rights upon or under the said tract.

8. In case the tract applied for is located on the margin of a river or lake, it shall not include more than one mile in direct distance along such water frontage, and shall be marked on the ground by two legal posts firmly fixed in the ground, one at each end of such front boundary. Parallel lines shall be drawn from each end of the front boundary at right angles thereto if possible, and extended back as far as may be necessary to include a total area of not more than 1,920 acres, the length of the location, however, not to exceed three miles. The posts shall be numbered 1 and 2, respectively. It shall not be lawful to remove post No. 1, but No. 2 post may be moved by a Dominion Lands Surveyor if the distance between the posts exceeds the length prescribed by these regulations, but not otherwise. The required notice of application shall, in such case, be posted conspicuously on the location near the margin of the river or lake on which it fronts.

9. Application for a lease of the petroleum and natural gas rights under lands situated in unsurveyed territory shall be made by the locator in person to the Agent of Dominion Lands for the district in which the tract applied for is situated, or to a sub-agent for such district, within thirty days from the date upon which the tract applied for was staked as above provided, if it is situated within one hundred miles of the office of the Agent or Sub-agent, otherwise it will not be considered. One extra day, however, shall be allowed for every additional ten miles or fraction thereof that the location is distant more than one hundred miles from the office of the Agent or Sub-agent.

10. Where two or more persons lay claim to the same location, or to portions of the same locations, situated in unsurveyed territory, the right to the lease shall be in him who can prove to the satisfaction of the Minister that he was the first to take possession of the tract in dispute by staking in the manner prescribed in these Regulations, and that he made application for a lease within the specified time.

11. As soon as the survey of a township has been confirmed, all petroleum and natural gas leases embracing any portion of such township so surveyed and confirmed, shall be made to conform to the Dominion Lands System of Survey if the Minister so decides, by the substitution of a new lease describing by sections, legal subdivisions of sections, or regular portions of legal subdivisions, as nearly as may be the tract embraced in the leasehold in so far as the township so surveyed is concerned. If any part of the leasehold is in territory which remains unsurveyed, it shall continue to be described as in the lease originally issued, until such portion is included in a confirmed survey.

12. As soon as the survey of a township has been confirmed, all petroleum and natural gas leaseholds embracing any portion of the township so surveyed and confirmed, shall be subject to the withdrawal forthwith from the lease, without compensation to the lessees, of any portions which, in accordance with such confirmed survey, are found to be the property of the Hudson's Bay Company.

13. The lease shall bear date from the day upon which the application is granted, and the rental for the first year at the rate of twenty-five (25c.) cents an acre shall be paid within thirty days from such date, otherwise the application shall absolutely lapse, and the rights applied for shall become available for other disposition. If during the term of the lease the lessee shall fail to pay the rental in advance for each subsequent year, at the rate of fifty (50c.) cents an acre per annum, within thirty days after the date upon which the same becomes due, the lease shall be subject to cancellation in the discretion of the Minister and to the immediate forfeiture of all the rights which the lessee had in the said lease.

Provided that if the lessee, in consideration of the expenditure to be incurred by him in actual boring operations upon his leasehold, makes application, at or before the beginning of the second and third years, respectively, of the term of the lease, for an extension of time within which to pay the rental when due, or becoming due, the Minister may grant such extension of time in writing, and if the lessee, before the end of the year in respect of which application was made, submits evidence to the Land Agent, or Sub-land Agent, of the district in which the leasehold is situated, in the form of affidavits by himself and two reliable witnesses, that during such year actual boring operations have been prosecuted upon his leasehold, as required by Section 15 of these Regulations, the amount expended in such boring operations, exclusive of the cost of machinery and casing, may be deducted from the rental which became due at the beginning of the said year. The balance of rental due, if any, shall be paid at the same time as the evidence in regard to work done is submitted, as above required. Failure to submit such evidence, or to pay the balance of rental due, will render the lease liable to cancellation, as hereinbefore provided.

14. The lessee shall, within one year from the date of the lease, have upon the lands described therein such machinery and equipment suitable for carrying on prospecting operations as the Minister may consider necessary, and he shall within the same period furnish evidence, supported by affidavit, showing the character, quantity and value of the machinery so installed and the date of its installation. If the required machinery is not installed within the period specified, and if evidence of its installation is not furnished within the prescribed period, the lease shall be subject to cancellation in the discretion of the Minister. Provided, however, that the Minister shall not require that the value of the machinery so installed shall exceed the sum of five thousand ($5,000) dollars.

15. The lessee shall commence boring operations on his leasehold within fifteen months of the date of his lease, and he shall continue such boring operations with reasonable diligence, to the satisfaction of the Minister, with a view to the discovery of oil or natural gas. If the lessee does not commence boring operations within the time prescribed, or if having commenced such operations he does not prosecute the same with reasonable diligence, to the satisfaction of the Minister, or

if he ceases to carry on the same for a period of more than three months, the lease shall be subject to cancellation, in the discretion of the Minister, upon three months' notice to this effect being given to the lessee. Provided, however, that if satisfactory evidence is furnished to show that the sum of at least two thousand ($2,000) dollars has been expended in actual boring operations, by recognized methods, upon the leasehold in any year, such expenditure shall be accepted as compliance with this provision for the year during which such expenditure was incurred.

16. The lease shall in all cases include only the oil and natural gas rights, which are the property of the Crown, but the lessee may, upon application, be granted a yearly lease at a rental of one ($1.00) dollar an acre per annum, payable yearly in advance, of whatever area of the available surface rights of the tract described in his petroleum and natural gas lease the Minister may consider necessary for the efficient and economical working of the rights granted him.

17. Should oil or natural gas in paying quantity be discovered on the leasehold, and should such discovery be established to the satisfaction of the Minister, the lessee will be permitted to purchase at the rate of ten ($10) dollars an acre whatever area of the available surface rights of the tract described in the lease the Minister may consider necessary for the efficient operation of the rights granted him.

18. If it is not established to the satisfaction of the Minister that oil or natural gas in paying quantities has been discovered on the leasehold, the lease shall be subject to termination upon two years' notice in writing being given to the lessee by the Minister.

19. The boundaries beneath the surface of a location shall be vertical planes or lines in which their surface boundaries lie.

20. A fee of two ($2) dollars shall accompany each application for a lease, which will be refunded if the rights applied for are not available, but not otherwise.

21. The lease shall be in such form as may be determined by the Minister of the Interior, in accordance with the provisions of these Regulations.

22. The lessee shall not assign, transfer or sublet the rights described in his lease, or any part thereof, without the consent in writing of the Minister being first had and obtained.

23. No royalty shall be charged upon the sales of the petroleum acquired from the Crown under the provisions of the Regulations up to the 1st day of January, 1930, but provision shall be made in the leases issued for such rights that after the above date the petroleum products of the location shall be subject to whatever Regulations in respect of the payment of royalty may then or thereafter be made.

24. A royalty at such rate as may from time to time be specified by Order in Council may be levied and collected on the natural gas products of the leasehold.

25. At the end of each year of the term of the lease the lessee shall furnish a statement, supported by affidavit, showing the number of days during the year that operations were carried on upon the location; the number of men so employed; the character of the work done; the depth attained; the total expenditure incurred; a detailed statement setting out fully the purpose for which such expenditure was incurred; the quantity of crude oil or natural gas obtained, and the amount realized from the sale thereof. Failure to furnish such yearly return will render the lessee subject to a fine of ten ($10) dollars a day for each day's delay in furnishing the sworn statement, and after three months' delay the lease shall be subject to cancellation.

These Regulations shall come into force on the second day of May, 1910.

TAR-SAND REGULATIONS

Regulations for the disposal of the Tar-sands, the property of the Crown, in that portion of the Province of Alberta lying north of Township 80, and between the 4th and 5th Initial Meridians. Approved by Order in Council, dated the 14th of February, 1910.

'Minister' shall mean the Minister of the Interior of Canada.

'Tar-sands' shall mean the sands and other material impregnated with tar, bitumen, petroleum, oil and other like substance found in deposit in the northerly portion of the Province of Alberta.

'Locator' shall mean the person who stakes out in the manner prescribed in these Regulations a tar-sand location in unsurveyed territory.

1. The tar-sand deposits which are the property of the Crown in that portion of the Province of Alberta lying north of Township 80, and between the 4th and 5th Initial Meridians, may be leased to applicants for a term of twenty-one years at an annual rental of fifty (50c.) cents an acre, payable yearly in advance. The term of the lease shall be twenty-one years, renewable for a further term of twenty-one years, provided the lessee can furnish evidence satisfactory to the Minister to show that during the term of the lease he has complied fully with the conditions of such lease, and with the provisions of the Regulations under which it was granted In case the surface rights of the lands have been disposed of, application for a lease of the tar-sand rights will not be entertained.

2. No applicant shall be allowed to lease more than an area of 1,920 acres.

3. The tract applied for, if situated in surveyed territory, shall consist of sections, or legal subdivisions of sections, but the several parcels comprising the tract must be contiguous, and the whole area applied for shall not exceed three miles in its greatest dimension. In unsurveyed territory, if the tract applied for is so situated as to admit of a definite description by sections, and legal subdivisions of sections, being furnished, that is, if at least one line bounding each section or part of a section applied for has been surveyed, and such survey duly approved, an application for the tar-sand rights may be considered under the provisions of this section.

4. Applications for such tar-sand rights shall be filed by the applicant in person with the Agent of Dominion Lands for the district in which the rights applied for are situated, or with a sub-agent for such district, for transmission by the agent to the Department of the Interior, but priority of application shall be based upon the date of the receipt of such application in the office of the Agent of Dominion Lands for the district. The application shall contain a description by section, part of section, township and range of the tract applied for.

5. If the tar-sand rights which an applicant desires to lease are situated in unsurveyed territory, application therefor shall be filed with the Agent of Dominion Lands for the district in which the rights applied for are situated, or with a sub-agent for such district, for transmission by the Agent to the Department of the Interior.

6. The application shall contain a description by metes and bounds of the tract applied for and shall be accompanied by a plan showing the position of such tract in its relation to some prominent topographical feature or other known point. The plan shall contain sufficient data to admit of the position of the tract applied for being definitely shown in the records of the Department. Such tract must be rectangular in form, except where a boundary of a previously located tract is adopted as common to both locations, the length not to exceed three times the breadth.

The application shall be accompanied by evidence supported by affidavit to show that the following requirements have been fully complied with by the applicant in person, and not through another:

(*a*) That the tract applied for has been duly defined on the ground by planting a wooden post at least four inches square, and standing not less than four feet above the ground, at one angle or corner of the said tract.

(*b*) Upon such post shall be inscribed the name of the applicant, the date of the location, the angle represented by the posts, the length and direction of the boundaries of the tract applied for. Thus: A. B.'s tar-sand location N.E. corner (meaning the northeast corner), this claim extends three miles west and one mile south from this post, or as the case may be.

(*c*) That a written or printed notice has been posted on a conspicuous part of the tract applied for, setting out the intention of the applicant to apply, within thirty days from the date of such notice, for a lease of the tar-sands upon or under the said tract.

In case the tract applied for is located on the margin of a river or lake, it shall not include more than one mile in direct distance along such water frontage, and shall be marked on the ground by two legal posts firmly fixed in the ground, one at each end of such front boundary. Parallel lines shall be drawn from each end of the front boundary at right angles thereto if possible, and extended back as far as may be necessary to include a total area of not more than 1,920 acres. The posts shall be numbered 1 and 2, respectively. It shall not be lawful to move post No. 1, but No. 2 post may be moved by a Dominion Lands Surveyor if the distance between the posts exceeds the length prescribed by these regulations, but not otherwise. The required notice of application shall, in such case, be posted conspicuously on the location near the margin of the river or lake on which it fronts.

7. Application for a lease of the tar-sand rights under lands situated in unsurveyed territory shall be made by the locator in person to the Agent of Dominion Lands for the district in which the tract applied for is situated, or with the sub-agent for such district, within thirty days from the date upon which the tract applied for was located, if it is situated within one hundred miles of the office of the agent, otherwise it will not be considered. One extra day, however, shall be allowed for every additional ten miles or fraction thereof that the location is distant more than one hundred miles from the office of the agent.

8. Where two or more persons lay claim to the same location, or to portions of the same locations, the right to acquire a lease shall be in him who can prove to the satisfaction of the Minister that he was the first to take possession of the tract in dispute by demarcation in the manner prescribed in these Regulations, and that he made application for a lease thereof within the specified time.

9. The lease shall bear date the day upon which the application was filed in the office of the Agent of Dominion Lands, and the rental for the first year shall

be paid within thirty days from such date, otherwise the application will absolutely lapse and the rights applied for shall become available for other disposition. If during the term of the lease the lessee shall fail to pay the rental in advance within thirty days from the date upon which the same becomes due, the lease shall be subject to cancellation in the discretion of the Minister, and to the immediate forfeiture of all the rights which the lessee had in the said lease.

10. As soon as the survey of a township has been confirmed, all tar-sand leases embracing any portion of such township so surveyed and confirmed, shall be made to conform to the Dominion Lands System of Survey if the Minister so decides, by the substitution of a new lease describing by sections, legal subdivisions of sections, or regular portions of legal subdivisions, as nearly as may be the tract embraced in the leasehold in so far as the township so surveyed is concerned. If any part of the leasehold is in territory which remains unsurveyed, it shall continue to be described as in the lease originally issued, until such portion is included in a confirmed survey.

11. The lease shall include the tar-sand rights only, but the lessee may, upon application, be permitted to purchase at the rate of ten ($10) dollars an acre whatever area of the available surface rights thereof the Minister may consider necessary for the efficient and economical working of the tar-sand rights granted under such lease.

No portion of the surface rights of a tar-sand location shall be granted to any person other than the lessee thereof until such lessee has been given an opportunity of acquiring the said rights, by notice in writing from the proper officer of the Department.

12. The lessee shall commence active operations on his leasehold within one year from the date upon which he may be notified by the proper officer of the Department of the Interior to do so, and shall produce from such operations the quantity of material specified in the said notification. Such notification shall not be given until the expiration of at least one year from the date of the lease, and shall set out the quantity of tar-sand which the lessee is required to excavate and produce ready for shipment or treatment, which quantity, however, may be increased by notification from time to time, but in no case shall the maximum quantity required to be excavated exceed ten tons per annum for each acre leased. In case operations are not commenced within the time specified in the notice, or if the required quantity of material is not mined during each year, the lease shall be subject to cancellation in the discretion of the Minister.

13. During each of the first three years of the term of the lease, however, the lessee shall be required to make such expenditure in the development of his leasehold, and in the installation of a plant and other appliances and equipment necessary for its efficient operation as may be prescribed in the lease, and he shall furnish evidence at the end of each such year to the satisfaction of the Minister that such expenditure has been incurred for the purpose and in the manner specified. In case satisfactory evidence is not furnished to show conclusively that the required expenditure has been incurred during each of the first three years, the lease shall be subject to immediate cancellation in the discretion of the Minister.

14. The lessee shall not assign, transfer, or sublet the rights described in his lease, or any part thereof, without the consent in writing of the Minister being first had and obtained.

15. The boundaries beneath the surface of a location shall be vertical planes or lines in which their surface boundaries lie.

16. A fee of five (85) dollars shall accompany each application for a lease, which will be refunded if the rights applied for are not available, but not otherwise.

17. The lease shall be in such form as may be determined by the Minister of the Interior, in accordance with the provisions of these Regulations.

18. No royalty shall be charged upon the products of any tar-sand location granted under these Regulations, or on the sales of the products of such location up to the 1st day of January, 1930, but provision shall be made in the lease issued for such location that after the above date, the products of the location shall be subject to whatever Regulations in respect of the payment of royalty may then or thereafter be made.

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